ST. FRANCIS RIVER BASIN REPORT

Arkansas and Missouri

VOLUME II
APPENDIX

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Forest Service
Economic Reserch Service

ARKANSAS SOIL AND WATER CONSERVATION COMMISSION

MISSOURI WATER RESOURCES BOARD

Little Rock, Arkansas

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ST. FRANCIS RIVER BASIN REPORT

ARKANSAS AND MISSOURI

Volume II
Appendix

Prepared by

U.S. DEPARTMENT OF AGRICULTURE

Economic Research Service
Forest Service
Soil Conservation Service

In Cooperation With

ARKANSAS SOIL AND WATER CONSERVATION COMMISSION
and
MISSOURI WATER RESOURCES BOARD

Under Direction of

USDA FIELD ADVISORY COMMITTEE

Little Rock, Arkansas

June 1974

ST. FRANCIS RIVER BASIN REPORT

ARKANSAS AND MISSOURI

Volume II
Appendix

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APPENDIX

I. INTRODUCTION

During the planning of the St. Francis River Basin, information was obtained in much more detail than could be presented in the main report. This appendix has been added to supplement the main report and preserve this information in a readily usable form when further detailed planning is necessary.

The appendix is keyed to the main report by a system of table numbers using Roman numerals to signify the chapter and Arabic numbers running consecutively.

Definition of OBERS

Several years ago the program acquired the acronym of OBERS signifying a unified effort by OBE and ERS in which an integrated set of projections was developed under a common set of assumptions and procedures. Although the OBE has been renamed the BEA and will be so referred to in this report, the widespread acceptance of the term OBERS has led to its continued use as a descriptive title of the projection program.

Acknowledgments of Data, Assistance, and Cooperation

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Arkansas Game and Fish Commission
Arkansas Geological Commission
Arkansas Planning Department
Arkansas Pollution Control and Department of Ecology
Arkansas Soil and Water Resources Division
Bureau of the Census
Bureau of Sport Fisheries and Wildlife
Corps of Engineers
Mississippi River Commission
National Oceanic and Atmospheric Administration

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Missouri Water Resources Board
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Water Pollution Control Survey of the St. Francis River Basin, Parts 1 and 2, Arkansas Pollution Control Commission
Arkansas Conservation Districts
  Phillips County Conservation District
  Lee County Conservation District
  St. Francis County Conservation District
  Greene County Conservation District
  Cross County Conservation District
  Clay Conservation District
  Poinsett Conservation District
  Craighead Conservation District
  Mississippi County Conservation District
  Crittenden Conservation District
  Woodruff County Soil & Water Conservation District
Missouri Conservation Districts
  Ste. Genevieve County Soil & Water Conservation District
  St. Francois County Soil & Water Conservation District
  Washington County Soil & Water Conservation District
  Madison County Soil & Water Conservation District
  Cape Girardeau County Soil & Water Conservation District
  Wayne County Soil & Water Conservation District
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- Big Creek Improvement District

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- Tri-County Drainage District
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- Drainage District No. 11
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St. Francis County
- Larkin Creek W P
- St. Francis Levee District
- New Castle Water Association Inc.
- Tri-County Drainage District

Lee County
- Black Swamp Drainage District
- Flag Lake Drainage District
- Hog Tusk Drainage District
- Greenbrier Drainage District
- Lee-Phillips & Larkin Creek Watersheds

Appendix table I-1--Drainage areas of the subbasins
St. Francis River Basin, Arkansas and Missouri

Subbasin	Drainage area	
	Acres	Sq. Mi.
Above Wappapello Reservoir	838,400	1,310
Main stem below Wappapello Reservoir	2,650,240	4,141
Little River System	1,313,280	2,052
L'Anguille River	600,320	938
Total	5,402,240	8,441

APPENDIX TABLES - CHAPTER II

Environmental Setting

Appendix table II-1--Soils associations and descriptions

MLRA 116 Missouri

The Ozark Highland consists of gently sloping to steep soils formed in weathered cherty and clayey limestones, calcareous clays and sandstone residuum. Bottom-land soils formed in local alluvium occur in narrow valleys.

1. Clarksville-Doniphan-Lebanon Association - Steep to gently sloping, somewhat excessive to moderately well drained soils formed wholly or partially in cherty limestone residuum on dissected uplands.

2. Crider-Hagerstown-Bardley Association - Gently sloping to strongly sloping, well drained soils formed wholly or partially in clayey residuum weathered from dolomite or limestone on the uplands.

3. Tilsit-Hector Association - Steep to gently sloping, moderately well and well drained soils formed wholly or partially in sandstone residuum on the uplands.

4. Midco-Gladden-Sharen Association - Nearly level to moderately sloping, somewhat excessive and well drained soils formed in alluvium.

5. Unnamed Soils Association - Very steep to gently sloping, somewhat excessive to moderately well drained soils formed wholly or partially in igneous rock residuum.

6. Doniphan-Union Association - Steep to gently sloping well and moderately well drained soils formed in cherty limestone and loess on the eastern Ozark border uplands.

MLRA 131 Arkansas and Missouri

The Southern Mississippi Valley Alluvium consists of soils formed in clayey to sandy alluvium on flood plains and natural levees along the Mississippi River and its tributaries.

10. Gideon-Wardell-Lilbourn Association - Nearly level, poorly and somewhat poorly drained soils formed in loamy alluvium.

11. Bosket-Broseley Association - Nearly level and gently undulating, well drained soils formed in loamy and sandy alluvium.

12. Sharkey Association - Level, poorly drained soils formed in clayey alluvium.

13. Dundee Association - Nearly level, somewhat poorly drained soils formed in loamy alluvium.

14. Bosket-Beulah-Broseley Association - Nearly level and gently sloping, well and somewhat excessively drained soils formed in loamy and sandy alluvium.

15. Commerce-Crevasse-Caruthersville Association - Nearly level and gently undulating, somewhat poorly to excessively drained soils formed in loamy and sandy alluvium.

16. Hayti-Portageville-Cooter Association - Level and gently undulating, very poorly to moderately well drained soils formed in clayey alluvium.

17. Lilbourn-Crevasse-Canalou Association - Level and gently undulating, somewhat poorly to excessively drained soils formed in loamy and sandy alluvium.

18. Gideon-Roellen-Sikeston Association - Level to nearly level, poorly drained, soils formed in loamy and clayey alluvium.

19. Amagon-Fountain-Beulah Association - Level and gently undulating, poorly and somewhat excessively drained soils formed in loamy alluvium.

22. Dubbs-Bosket-Beulah Association - Level and gently undulating, well and somewhat excessively drained soils formed in loamy alluvium.

23. Commerce-Robinsonville-Convent Association - Level and gently undulating, somewhat poorly and well drained soils formed in loamy alluvium.

24. Sharkey-Tunica Association - Level and gently undulating, poorly drained soils formed in clayey and loamy alluvium.

25. Sharkey-Steele Association - Level, poorly drained, moderately well drained soils formed in clayey and loamy alluvium.

26. Amagon-Dundee-Crevasse Association - Level and gently undulating, poorly to excessively drained soils formed in loamy and sandy alluvium.

27. Dundee-Dubbs Association - Level and gently undulating, somewhat poorly and well drained soils formed in loamy alluvium.

30. Alligator-Earle-Sharkey Association - Level and gently undulating, poorly and somewhat poorly drained, acid and nonacid soils formed in clayey and loamy alluvium.

32. Mhoon-Dundee Association - Level, poorly drained and somewhat poorly drained soils formed in loamy alluvium.

33. Alligator-Sharkey Association - Level and gently undulating, poorly drained soils formed in clayey alluvium.

36. Newellton-Sharkey-Tunica Association - Level and gently undulating, poorly and somewhat poorly drained, nonacid soils formed in clayey and loamy alluvium.

38. Mantachie-Iuka-Ochlockonee Association - Level and undulating, somewhat poorly and well drained soils formed in loamy alluvium.

39. Alligator-Earle Association - Level and gently undulating, poorly and somewhat poorly drained acid soils formed in clayey and loamy alluvium.

MLRA 134 Arkansas and Missouri

The Southern Mississippi Valley silty upland consists of loamy soils formed in thick loess on gently sloping to steep uplands and low broad flats. Alluvial soils on flood plains and low terraces formed in silty sediments washed from the loess uplands are also included in this region.

7. Falaya-Collins Association - Level to nearly level, somewhat poorly and moderately well drained soils formed in alluvium on flood plains.

8. Calhoun-Wrightsville Association - Level, poorly drained soils formed in loess capped alluvium on low terraces.

9. Loring-Memphis Association (Missouri) - Gently sloping to steep, well and moderately well drained soils formed in thick loess on uplands.

20. Loring-Memphis Association (Arkansas) - Gently sloping to steep, moderately well and well drained soils formed in thick loess on uplands.

21. Calhoun-Calloway-Fountain Association - Level and nearly level, poorly and somewhat poorly drained soils formed in thick loess on broad flats.

28. Henry-Calhoun-Calloway Association - Level and nearly level, poorly and somewhat poorly drained soils formed in thick loess on broad flats.

29. Hillemann-Henry Association - Level and nearly level, somewhat poorly and poorly drained loamy soils formed in thick loess on broad flats.

31. Arkabutla-Collins Association - Level, somewhat poorly and moderately well drained soils formed in loamy alluvium on flood plains.

34. Calloway-Loring-Henry Association - Level and nearly level, poorly to moderately well drained, loamy soils formed in thick loess on broad flats and narrow ridges.

35. Zachary-Tichnor Association - Level, poorly drained, soils that were formed in loamy alluvium on flood plains.

37. Memphis-Natchez Association - Nearly level to steep, well drained loamy soils formed in thick loess on the uplands.

40. Loring-Memphis-Grenada Association - Nearly level to steep, moderately well and well drained, loamy soils formed in thick loess on the uplands.

41. Calloway-Henry Association - Level and nearly level, poorly and somewhat poorly drained, loamy soils formed in thick loess on broad flats.

Appendix table II-1a--Descriptions of soil productivity groups

Missouri:

SPG 1. MLRA's 131 and 134

Deep, well drained, medium textured soils developed in loess and alluvium. They have high available moisture capacity. Slopes are level to about 20 percent. Erosion is slight to severe. Capability classes are I, II, III, IV, and VI. Major soil series are Memphis, Loring Caruthersville, Dubbs, and Bosket.

SPG 2. MLRA's 131 and 134

These are moderately deep soils underlain by gravel or sand and some have a fragipan. They developed in alluvium, or loess over coastal plains gravel and sand. They are on level to 9 percent slopes and have medium to low available moisture. Erosion is slight to severe. Capability classes are II, III, and IV. Soils include small gravelly bottoms like the Elash and Gladden series and the upland Lax and Providence series.

SPG 3. MLRA 134

This group consists of moderately well drained soils developed in loess on Crowley's Ridge and moderately well and somewhat poorly drained soils developed in alluvium on gently sloping bottoms. The silt loam surface is underlain by a silt loam or light silty clay loam subsoil. The available moisture capacity is generally high on uneroded soils and medium on eroded soils. They occupy slopes ranging from 2 to 13 percent. There is slight and moderate and in some places severe erosion. The capability classes are II, III, and IV. The upland part is mostly Grenada soils and the gently sloping bottoms are occupied by Falaya and Collins.

SPG 4. MLRA 131

Deep, somewhat poorly and poorly drained soils on level or nearly level bottomlands of the Mississippi River Delta. These soils are developed in coarse-silty, fine loamy and fine silty textured alluvium. They all have high available moisture. Since they occupy level areas, erosion is not a problem. Moderate to severe wetness is a problem. Capability classes are II and III. The soils include the Falaya, Commerce, Dundee, Waverly, Mhoon, Hayti, Sikeston, and Gideon series.

SPG 5. MLRA 131

These are mostly deep, poorly and somewhat poorly drained soils with silt loam surface layers over silty clay loam, clay loam, or clay subsoils. Some, however, have silt loam or sandy loam textures. The available moisture capacity is medium. Slopes are level to about 10 percent. There is a moderate to severe wetness problem on level areas and a severe erosion hazard on the slopes. Capability classes are II, III, IV, and VI. The major soils are Calhoun, Amagon, Wardell,

Forestdale, Zachery, Calloway, and Patterson.

SPG 6. MLRA 131

These are poorly drained, fine textured soils developed in clayey sediments deposited by still water on backswamp areas. They are level to slightly depressional. The clayey surface is underlain by dark or gray clay to depths of 3 feet or more except for the Tunica series which is underlain by loamy sediments between 24 and 36 inches. The soils have low available moisture capacity. Wetness is a severe problem because of overflow, slow runoff, high water table, and slow internal drainage. Capability classes are II and III. Major soils are Sharkey, Alligator, Iberia, and Tunica.

SPG 7. MLRA 131

These are deep, well to excessively drained, rapidly permeable soils developed in sandy alluvium. They contain low and very low available moisture. They are on nearly level to undulating areas of the Mississippi River Delta. These soils have a droughty problem and undulating areas are especially subject to blowing. Capability classes are III and IV. Soil series include Crevasse, Canalou, Bruno, and Steele.

SPG 8. MLRA 131

This group contains those unidentified soils heretofore referred to as organic soils. The major area of this occurrence is in the extreme northern part of LRA 131. These soils are poorly drained, dark colored, wet soils developed mostly from organic materials under wet swampy conditions. It is mostly capability class III. Soils unknown.

SPG 9. MLRA 134

This unit consists of steep slopes occupied by well and moderately well drained soils developed in loess, coastal plains gravel and cherty limestone residuum. They range from deep to shallow, high to low available moisture capacity and from 15 to about 35 percent slope. Erosion is a severe hazard. The shallow soils and the gravelly soils are droughty. Capability classes are VI and VII land. The major soils are of the Loring, Memphis, Saffell, Grenanda, and Clarksville series.

SPG 10. MLRA's 115 and 116

All this group consists of deep, well and moderately well drained soils of the uplands and bottoms. The silt loam surface is over silt loam, silty clay loam, or clayey textured subsoils. These soils are developed in loess, limestone residuum, and alluvium on nearly level to steep slopes. The nearly level areas have no major problems while the sloping part is subject to erosion. They contain mostly high available moisture. Capability classes are I, II, III, and IV. The soil series include the Ashton, Nolin, and Sharen of the bottomland, and the Crider, Hagerstown, Memfro, and Winfield of the uplands.

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SPG 11. MLRA 115 and 116

This group contains mostly moderately deep soils on stream bottoms and uplands underlain by gravel, chert, or fragipans. The soils are somewhat excessively drained, well drained, and moderately well drained. They contain medium and low available water. They occupy nearly level to moderate slopes. Droughtiness is common to the soils and in addition the sloping areas are subject to moderate to very severe erosion. Mainly capability classes II, III, and IV. The major soils are of the Elash, Gladden, and Razort series of the small stream bottoms and the Lebanon and Plato series of the uplands.

SPG 12. MLRA 115 (Possibly a small amount in 116).

This group is composed of moderately well drained soils developed in 2 to 4 feet of loess over cherty limestone or sandstone residuum. A moderately to strongly developed fragipan occurs at 30 to 40 inches depth in uneroded profiles. These soils occupy upland and low slope positions of 2 to 13 percent slope. The available moisture capacity is medium. There is a moderate to very severe erosion hazard. Capability classes include II, III, and IV. The major soil series are Union, Tilsit, and some acreage of Viraton.

SPG 13. MLRA's 115 and 116

This group is made up of deep somewhat poorly and poorly drained soils of the level or nearly level stream bottoms. They have silt loam and silty clay loam textures throughout. They have a moderate to severe wetness problem due to overflow, slow runoff, and high water table. The available moisture capacity is generally high. Capability classes are II and III. Soils include the Belknap, Newark, Westerville, Melvin, Dockery, and Bonnie series.

SPG 14. MLRA's 115 and 116 (mostly 115)

Deep, somewhat poorly and poorly drained soils of the uplands and second bottoms (terraces) make up this group. The silty surface is over a silty, clayey loam, or clayey subsoil. They are developed in loess and alluvium and nearly level to gentle slopes. The available moisture capacity is medium. Nearly level areas have a wetness problem and sloping fields have a moderate to severe erosion hazard. The capability classes are III and IV. The soils are Auxvassa, Freeburg, Marion, Moniteau, and Weldon.

SPG 15. MLRA 116

This group consists primarily of shallow and cherty, moderately well to somewhat excessively drained soils of the Ozark highlands. Most of the acreage is gentle to sloping ridge tops and gently sloping narrow stream bottoms. They contain low available moisture. Although the soils are droughty, the major problem is considered to be its susceptibility to erosion. Capability classes are III and IV. Soils include Clarksville, Coulstone, Nixa, Elash, and Razort.

SPG 16. MLRA 115 and 116

Soils of this group are shallow, cherty, and stony. They range from moderately well to somewhat excessively drained soils, mostly on steep slopes. A small acreage is gravel beds along the channel of the larger streams. All these soils generally contain only very low available moisture. All the soils are droughty but at the same time are subject to severe erosion because of the steep slope which they occupy. However, the shallow soils are considered to have a dominant limitation of droughtiness and the deeper cherty and stony soils have a dominant hazard of erosion. They are capability classes IV, VI, and VII. The major soil series are Gasconade, Hector, Clarksville, Coulstone, Doniphan, Ashe, and Lebanon. Included are the land types: Rockland and Riverwash.

Arkansas:

SPG 17. MLRA 134

Capability classes II, III, and IV. Soil groups 5, 65, and M56. Deep, moderately well drained and somewhat poorly drained soils. Silt loam over very slowly permeable clay subsoil. Slow to medium runoff. Moderate available moisture capacity. Moderately erosive. Mostly Stuttgart and Hillemann soils on gentle slopes.

SPG 18. MLRA 134

Capability classes I, II, III, and IV. Mostly soil groups 67, 6p, and 67L. Deep, moderately well drained and well drained loess soils. Brown silt loam over moderately permeable, to slowly permeable, silty clay loam subsoil. Some have a pan layer in the subsoil. Moderate available moisture capacity. Very erosive soils. Slopes 0 to 12 percent. Major soils are Memphis, Loring, and Grenada.

SPG 19. MLRA 134

Capability classes VI and VII. Soil groups 67L and 7vd. Deep, well drained loess soils. Brown silt loam over moderately permeable, crumbly, silty clay loam subsoil. Some areas are gravelly. Moderate available moisture capacity. Very erosive soils. Slopes 12 to more than 20 percent. Major soils are Memphis, Loring, and Brandon.

SPG 20. MLRA 134

Capability classes I and II. Soil group 89. Deep, well drained bottom-land soils. Friable, silt loam surface over moderately permeable, crumbly, silt loam subsoil. Moderately high available moisture capacity. Slight to moderate overflow hazard. Slopes 0 to 3 percent. Mostly Collins soils.

SPG 21. MLRA 134

Capability classes II, III, and IV. Soil groups 1a, 5a1, 5a1L, 6a1, 6a1L, and 65a. Deep, somewhat poorly and poorly drained soils. Grayish, friable, silt loam over grayish, slowly permeable, compact silty clay loam or silty clay subsoil. Moderate available moisture capacity. Seasonal water table near surface. Principal soils are Crowley, Calhoun, Henry, and Calloway.

SPG 22. MLRA 134

Capability classes II, III, and Vw. Soil groups 3a, 8a, 8a1, 18a, and 89. Deep, poorly drained or overflowed bottom land. Gray loams and clays over mottled silt loam, silty clay loam to clay subsoil. Seasonal high water table. Slight to severe overflow hazard. Principal soils are Arkabutta, Waverly, Tichnor, and Zachary.

SPG 23. MLRA 131

Capability classes I, II, and III. Soil groups 4 and 89. Deep, moderately well drained and well drained bottom-land soils. Crumbly clay to silty clay loam and friable loam over slowly to moderately permeable clay, sandy clay loam, silty clay loam, or loam subsoil. Moderate to moderately high available moisture capacity. Slight overflow hazard; slight erosion hazard. Slopes 0 to 8 percent. Principal soils are Dundee, Bosket, and Dubbs.

SPG 24. MLRA 131

Capability classes II, III, and V. Soil groups 3, 3a, 3z, and 4a1. Deep, poorly to somewhat poorly drained bottom-land soils. Mostly gray or mottled clay to silty clay, locally over stratified sandy subsoil. Moderately high available moisture capacity. Seasonal high water table. Slight to severe overflow hazard. Principal soils are Alligator, Bowdre, Earle, Newellton, Sharkey, and Tunica.

SPG 25. MLRA 131

Capability classes II, III, and V. Soil groups 8a, 8a1, 18a, 14a, and 89. Deep, poorly drained bottom-land soils. Gray loams over moderately high available moisture capacity. Subject to moderate to severe overflow and high seasonal water table. Principal soils are Amagon, Forestdale, Mhoon, Dubbs, Commerce, and Robinsville.

SPG 26. MLRA 131

Capability class III. Soil group 15x. Deep, excessively drained bottom-land soil. Rapidly permeable, loose, loamy sand. Low available moisture capacity. Some areas subject to overflow. Slope 0 to 3 percent. Mostly Bruno and Crevasse soils.

SPG 27. MLRA 134

Capability classes I, II, III, and IV. Mostly soil groups 67, 6p, and 67L. Deep, moderately well drained and well drained loess soils. Brown silt loam over moderately permeable, to slowly permeable, silty clay loam subsoil. Some have a pan layer in the subsoil. Moderate available moisture capacity. Very erosive soils. Slopes 0 to 12 percent. Major soils are Memphis, Loring, and Grenada.

SPG 28. MLRA 134

Capability classes II, III, and IV. Soil groups 1a, 5a1, 5a1L, 5aL, 6a1L, and 65a. Deep, somewhat poorly and poorly drained soils. Grayish, friable, silt loam over grayish, slowly permeable, compact silty clay loam or silty clay subsoil. Moderate available moisture capacity. Seasonal water table near surface. Principal soils are Crowley, Calhoun, Henry, and Calloway.

Appendix table II-2--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
1. Clarksville-Doniphan-Lebanon						
Clarksville	Moderate: slope (D) 6-15% Severe: slope (E&F) 15-40%	Severe: slope, permeability	Moderate: slope, 15-20% cherty material Severe: slope 25%	Moderate: slopes 8-15%	Moderate: slopes 8-15%	Moderate: slopes 8-15% Severe: slopes 15-40%
Doniphan	None to slight: slopes 8% or less Moderate: slopes 8-15% Severe: slopes over 15%	Moderate: slopes 2-7%, permeability Severe: slopes ovar 7 %	None: slopes 2-15% Slight: slopes 15-25% Severe: slopes over 25%	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%
Lebanon	Severe: permeability	Moderate: slopes 2-7%, seasonally high water table Severe: slopes over 7%	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Moderate: traffic supporting capacity
2. Crider-Hagerstown-Bardley						
Crider	Slight: slopes 8% or less Moderate: slopes 8-15%	Moderate: slopes 3-7% Severe: slopes over 7%	Slight: slopes 2-15%	Moderate: slopes 8-15%, shrink-swell	Moderate: slopes 8-15%, shrink-swell	Moderate: slopes 8-15%, shrink-swell
Hagerstown	Slight: slopes 3-8% Moderate: slopes 8-15%	Moderate: slopes 3-7%, permeability Severe: slopes over 7%	Slight: slopes 3-15%	Moderate: slopes 8-15%	Moderate: slopes 8-15%	Moderate: slopes 8-15%
Bardley	Severe: depth to bedrock	Severe: slopes 7-17%, depth to bedrock	Severe: depth to bedrock	Severe: shrink-swell	Severe: shrink-swell	Severe: traffic supporting capacity
3. Tilsit-Hector						
Tilsit	Severe: slopes 1-8%, permeability Severe: slopes 8-15%, permeability	Slight: slopes 1-2% Moderate: slopes 2-7% Severe: slopes 7-15%		Moderate: slopes 1-6%, bearing capacity, wetness Moderate: slopes 6-15%, bearing capacity	Moderate: slopes 1-4%, bearing capacity Moderate: slopes 4-8%, bearing capacity Severe: slopes 8-15%	Moderate: slopes 1-6%, traffic supporting capacity Moderate: slopes 6-15%, traffic supporting capacity
Hector	Severe: depth to bedrock	Severe: depth to bedrock		Severe: slope and depth to bedrock	Severe: slope and depth to bedrock	Severe: slope and depth to bedrock
4. Midco-Gladden-Sharen						
Midco	Severe: flooding	Severe: permeability, coarse fragments, flooding	Severe: flooding, permeability	Severe: flooding	Severe: flooding	Severe: flooding
Gladden	Severe: flooding	Severe: permeability, texture, floods	Severe: flooding, permeability	Severe: flooding	Severe: flooding	Moderate: traffic supporting capacity, flooding
Sharen	Moderate: permeability, seasonally high water table	Moderate: permeability		Moderate: bearing capacity	Severe: flooding	Severe: traffic supporting capacity, flooding
5. Unnamed Soils	DATA NOT AVAILABLE					

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
6. Doniphan-Union						
Doniphan	None to slight: slopes 8% or less Moderate: slopes 8-15% Severe: slopes 15% and over	Moderate: slopes 2-7%, permeability Severe: slopes 7% and over	None: slopes 2-15% Slight: slopes 15-25% Severe: slopes 25% and over	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%	Moderate: slopes 8-15%, shrink-swell potential Severe: slopes over 15%
Union	Severe: permeability	Moderate: slopes 2-7%, seasonally high water table Severe: slopes 7-20%	Severe: seasonally high water table	Severe: seasonally high water table above fragipan for longer than one month	Severe: seasonally high watsr table	Moderate: shrink-swell potential
7. Falaya-Colline						
Falaya	Severe: seasonally high water table, flooding	Moderate to severe: permeability, flooding	Severe: seasonally high water table, flooding	Severe: seasonally high water table, flooding	Severe: seasonally high water table, flooding	Severe: seasonally high water table, flooding Moderate: treffic supporting capacity
Collins	Severe: seasonally high water table, flooding	Moderate: permeability		Severe: seasonally high water table, flooding	Severe: seasonally high water table, subject to flooding	Severe: traffic supporting cepacity, seasonally high water table, flooding
8. Calhoun-Wrightsville						
Calhoun	Severe: permeability, seasonally high water table	Severe: seasonal water table	Severe: seasonally high water table	Severe: permeability, seasonally high water table	Severe: corrosivity of uncoated steel, seasonally high water table	Severe: seasonally high water table
Wrightsville	Severe: permeability, seasonally higb water table	Slight		Severe: wetness, shrink-swell potential	Severe: wetness, shrink-swell potential, corrosivity of uncoatsd steel	Severe: wetness, shrink-swell potential, traffic supporting capacity
9. Loring-Memphis						
Loring	Severe: permeability	Moderate: slopes 2-7% Severe: slopes 7-20%		Moderate: slopes 2-6%, bearing capacity Moderate: slopes 6-15%, bearing capacity Severe: slopes 15-20%	Moderate: slopes 2-8%, bearing capacity Severe: slopes 8-20%	Moderate: slopes 2-15%, traffic supporting capacity Severe: slopes 15-20%
Memphis	Slight: slopes 0-5% Moderate: slopes 5-10% Severe: slopes 10-40%	Moderate: slopes 0-7%, permeability Severe: slopes 7-40%		Moderate: slopes 0-15%, bearing capacity Severe: slopes 15-40%	Moderate: slopes 0-8%, bearing cspacity Severe: slopes 8-40%	Moderate: 0-8%, traffic eupporting capacity Severe: slopes 8-40%
10. Gideon-Wardell						
Gideon	Severe: permeability, seasonally high water table	Severe: ssasonally high water table	Severe: ssasonally high water table, poorly drained	Severe: seasonally high water table	Severe: ssasonally high water teble	Severe: seasonally high water teble
Wardell	Severe: permeability, seasonally high water table	Severe: seasonally high water tsble	Severe: seasonally bigh water table	Severe: seasonally high water table, bigb shrink-swell	Severe: seasonally higb water table, high shrink-swell	Severe: high shrink-swell potential, traffic supporting cepecity

Appendix teble II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
11. Bosket-Broseley						
Bosket	Slight to moderate: slopes 0-5%, permeability Moderate: slopes 5-7% Severe: if flooded	Moderate: slopes 0-7%, permeability Severe: slopes 7-8%		Slight: slopes 0-6%, flooding Moderate: slopes 6-8% Severe: if flooded	Slight: slopes 0-4% Moderate: slopes 0-8% Severe: if flooded	Slight Severe: if flooded
Broseley:	Slight: slopes 0-8% Moderate: slopes 8-12%	Severe: slopes 0-7%, seepage Severe: slopes 7-12%, ssepage	Severe: permeability	Slight: slopes 0-8% Moderats: slopes 8-12%	Slight: slopes 0-4% Moderate: slopes 4-8% Severe: slopes 8+%	Moderete: slopes 0-8%, traffic supporting capacity Moderate: slopes 8-12%, traffic supporting capacity
12. Sherkey						
Sharkey	Severe: permeability, seasonally high water table, flooding on flooded phases	Slight: if flooding Severe: flooded phases	Severe: texture, seasonally high water table, flooding on flooded phasee	Severe: seasonally high water table, shrink-swell potential, texture, flooded phases Very severe: flooding	Severe: seasonally high water table, shrink-swell potential, texture, flooded phases Very severe: flooding	Severe: shrink-swell potential, texture, flooding on flooded phases, seasonally high water table
13. Dundee						
Dundee	Severe: permeability, seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Moderate: traffic supporting capacity, seesonally high water table
14. Bosket-Beulah-Broseley						
Bosket	(See Bosket listed under No. 11)					
Beulah	Slight: slopes 0-5% Moderate: slopes 5-8%	Severe: permeability		Moderate: bearing capacity	Moderate: bearing capacity	Slight to moderate: traffic supporting capacity
Broseley	(See Broseley listed under No. 11)					
15. Commerce-Crevasse-Caruthersville						
Commerce	Severe: permeability, some areas subject to flooding, seasonally high water table	Severe: flooding on some areas, seasonally high water table	Severe: seasonally high water table, some areas subject to flooding	Moderate: seasonally high water table Severe: where subject to flooding	Moderate: seesonally high water table, corrosivity of uncoated steel Severe: if subject to flooding	Moderate: seasonally high water teble, traffic supporting capacity Severe: if subject to flooding
Crevasse	Slight Severe: if subject to flooding	Severe: permeability	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding	Slight Severs: if subject to flooding	Slight Severe: if subject to flooding
Ceruthersville	Moderate: seasonally high water table	Moderate: permeability	Severe: seasonally high water table, flooding	Moderate: seasonally high water table	Moderate: seasonally high water table	Moderate: seasonally high water teble, traffic supporting capacity

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
16. Hayti-Portageville-Cooter						
Hayti	Severe: flooding, permeability, seasonally high water table	Slight: if protected Severe: flooding	Severe: flooding, seasonally high water table	Severe: flooding, shrink-swell, seasonally high water table	Severe: flooding, shrink-swell potential, seasonally high water table	Severe: flooding, traffic supporting capacity, ssasonally high water table
Portageville	Severe: permeability, seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table, shrink-swell potential	Severe: seasonally high water table, shrink-swell potential	Severe: shrink-swell potential, traffic supporting capacity
Cooter	Severe: permeability, seasonally high water table	Severe: permeability	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high watsr table	Slight: shrink-swell potential
17. Lilbourn-Crevasse-Canalou						
Lilbourn	Severe: permeability, seasonally high water table	Severe: permeability, seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Moderate: seasonally high water table
Canalou	---------- DATA NOT AVAILABLE ----------					
Crevasse	(See Crevasse listed in No. 15)					
18. Gideon-Roellen-Sikeston						
Gideon	(See Gideon listed in No. 10)					
Roellen	Severe: permeability, seasonally high water table	Slight: if protected Severe: if flooded		Severe: severe wetness, some areas flood, low bearing capacity, shrink-swell potential	Severe: low bearing capacity, severe wetness, shrink-swell potential, very high corroeivity of uncoated steel, some areas flood	Severe: traffic supporting capacity, severe wetness, shrink-swell potential, some areas flood
Sikeston	Severe: permeability, seasonally high water table	Moderate: permeability	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table	Severe: seasonally high water table, traffic supporting capacity
19. Amagon-Fountain-Beulah						
Amagon	(See Amagon listed under No. 16)					
Fountain	(See Fountain listed under No. 4)					
Beulah	(See Beulah listed under No. 17)					
20. Loring-Memphis						
Loring	(See Loring listed under No. 40)					
Memphis	(See Memphis listed under No. 40)					

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
21. Calhoun-Calloway-Fountain						
Calhoun	Severe: permeability, seasonally high water table	Slight	Severe: seasonally high water table	Severe: seasonally high water table	Severe: corrosivity to uncoated steel, seasonally high water table	Severe: traffic supporting capacity, seasonally high water table
Calloway	(See Calloway listed under No. 34)					
Fountain	Severe: permeability	Slight	Severe: seasonally high water table	Severe: seasonally high water table	Severe: corrosivity to uncoated steel, seasonally high water table	Severe: traffic supporting capacity, seasonally high water table
22. Dubbs-Bosket-Beulah						
Dubbs	(See Dubbs listed under No. 27)					
Bosket	(See Bosket listed under No. 11)					
Beulah	Slight	Severe: permeability	Severe: permeability	Slight	Slight	Slight
23. Commerce-Robinsonville-Convent						
Commerce	Severe: permeability, some areas flood, seasonally high water table	Severe: seasonally high water table, some areas flood	Severe: seasonally high water table, some areas flood	Moderate: seasonally high water table, some areas flood	Moderate: seasonally high water table, corrosivity, some areas flood	Moderate: ssasonally high water table, traffic supporting capacity, some areas flood
Robinsonville	Slight: severe if subject to flooding	Severe: permeability, some areas flood	Severe: permeability, some areas flood	Slight: severe if subject to flooding	Slight: severe if subject to flooding	Slight: severe if subject to flooding
Convent	Severe: permeability, seasonally high water table	Severe: permeability, seasonally high water table	Severe: permeability, seasonally high water table	Moderate: bearing capacity, seasonally high water table	Moderate: bearing capacity, seasonally high water table	Moderate: traffic supporting capacity, seasonally high water table
24. Sharkey-Tunica	(See Sharkey and Tunica under No. 36)					
25. Sharkey-Steele						
Sharkey	(See Sharkey listed under No. 36)					
Steele	Severe: permeability, seasonally high water table	Severe: sandy surface and clayey subsoil, some areas flood	Severe: texture, seasonally high water table, some areas flood	Moderate: bearing capacity Severe: if subject to flooding	Moderate: bearing capacity, shrink-swell potential below 30 inches Severe: if subject to flooding	Moderate: seasonally high water table, moderate traffic supporting capacity Severe: if subject to flooding
26. Amagon-Dundee-Crevasse						
Amagon	Severe: permeability, seasonally high water table, some areas flood	Slight: severe if subject to flooding	Severe: seasonally high water table, some areas flood	Severe: bearing capacity, some areas flood	Severe: seasonally high water table, low bearing capacity, some areas flood	Severe: seasonally high water table, traffic supporting capacity, some areas flood
Dundee	(See Dundee listed under No. 13)					
Crevasse	Slight: severe if subject to flooding	Severe: permeability	Severe: permeability	Slight: severe if subject to flooding	Slight: severe if subject to flooding	Slight: severe if subject to flooding

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
27. Dundee-Dubbs						
Dundee	Severe: permeability, seasonally high water table	Slight	Severe: seasonally high water table	Severe: bearing capacity	Severe: seasonally high water table, bearing capacity, corrosivity	Severe: seasonally high water table, traffic supporting capacity
Dubbs	Slight	Moderate: permeability	Moderate: seasonally high water table, above 5 feet in some areas	Moderate: bearing capacity	Moderate: bearing capacity	Moderate: traffic supporting capacity
28. Henry-Calhoun-Calloway						
Henry	(See Henry listed under No. 41)					
Calhoun	Severe: seasonally high water table, slow permeability	Slight	Severe: seasonally high water table	Severe: seasonally high water table	Severe: corrosivity, seasonally high water table	Severe: seasonally high water table, traffic supporting capacity
Calloway	(See Calloway listed under No. 41)					
29. Hillemann-Henry						
Hillemann	Severe: permeability, seasonally high water table	Slight	Severe: seasonally high water table	Moderate: seasonally high water table, shrink-swell potential	Moderate: seasonally high water table, shrink-swell potential	Severe: seasonally high water table, shrink-swell potential
Henry	(See Henry listed under No. 41)					
30. Alligator-Earle-Sharkey						
Alligator	Severe: permeability, seasonally high water table	Slight: severe if subject to flooding	Severe: texture, seasonally high water table, some areas flood	Severe: seasonally high water table, shrink-swell potential, some areas flood	Severe: seasonally high water table, shrink-swell potential, corrosivity, some areas flood	Severe: traffic supporting capacity, shrink-swell potential, texture, some areas flood
Earle	Severe: permeability, seasonally high water table	Slight	Severe: texture, seasonally high water table	Severe: seasonally high water table, bearing capacity, shrink-swell potential	Severe: seasonally high water table, bearing capacity, shrink-swell potential	Severe: shrink-swell potential, traffic supporting capacity
Sharkey	(See Sharkey listed under No. 36)					
31. Arkabutla-Collins						
Arkabutla	Severe: seasonally high water table, some areas flood	Moderate: permeability	Moderate: permeability, seasonally high water table	Moderate: seasonally high water table, some areas flood	Severe: seasonally high water table, corrosivity	Moderate: seasonally high water table, traffic supporting capacity
Collins	Moderate: permeability Severe: if subject to flooding	Moderate: permeability Severe: if subject to flooding	Moderate: permeability Severe: if subject to flooding	Moderate: bearing capacity Severe: if subject to flooding	Moderate: bearing capacity Severe: if subject to flooding	Moderate: traffic supporting capacity Severe: if subject to flooding

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francis River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
32. Mhoon-Dundee						
Mhoon	Severe: permeahility, some areas flood	Slight	Severe: seasonally high water tahle	Severe: seasonally high water tahle, some areas flood	Severe: bearing capacity, some areas flood	Severe: seasonally high water table, traffic supporting capacity
Dundee	(See Dundee listed under No. 13)					
33. Alligator-Sharkey						
Alligator	(See Alligator listed under No. 8)					
Sharkey	(See Sharkey listed under No. 36)					
34. Calloway-Loring-Henry						
Calloway	Severe: seasonally high water tahle, permeahility	Slight	Severe: seasonally high water tahle	Severe: seasonally high water table	Severe: seasonally high water tahle	Moderate: seasonally high water tahle, traffic supporting capacity
Loring	Severe: permeahility	Moderate: slope	Moderate: slope	Moderate: bearing capacity	Moderate: bearing capacity	Moderate: traffic supporting capacity
Henry	Severe: seasonally high water tahle, permeability	Slight	Severe: seasonally high water tahle	Severe: seasonally high water tahle.	Severe: seasonally high water tahle, bearing capacity	Severe: seasonally high water tahle, low traffic supporting capacity
35. Zachary-Tichnor						
Zachary and Tichnor	Severe: permeahility, seasonally high water table, flooding	Moderate: texture, permeahility Severe: if subject to flooding	Severe: seasonally high water table, subject to flooding	Severe: seasonally high water table, subject to flooding	Severe: seasonally high water tahle, suhject to flooding, corrosivity	Severe: seasonally high water tahle, subject to flooding
36. Newellton-Sharkey-Tunica						
Newellton	Severe: seasonally high water tahle, some areas flood	Severe: seasonally high water tahle, some areas flood	Severe: texture, seasonally high water table, some areas flood	Moderate: seasonally high water table, shrink-swell potential, some areas flood	Moderate: seasonally high water tahle, shrink-swell potential Severe: in areas that flood	Severe: seasonally high water tehle, treffic supporting capacity, shrink-swell potential
Sharkey	Severe: seasonally high water tahle, permeahility, some areas flood	Slight: eevere if suhject to flooding	Severe: seasonally high water table, some areas flood	Severe: seasonally high water tahle, shrink-swell potential, some areas flood	Severe: seasonally high water tahle, shrink-swell potential, corrosivity, some areas flood	Severe: seasonally high water tahle, traffic supporting capacity, shrink-swell potential, some areas flood
Tunica	Severe: seasonally high water tahle, permeability, some areas flood	Severe: seaeonally high water table, some areas flood	Severe: seasonally high water table, texture, some areas flood	Severe: seasonally high water tahle, shrink-swell potential, some areas flood	Severe: seasonally high water tahle, shrink-swell potential, corrosivity, some areas flood	Severe: seasonally high water table, shrink-swell potential, some areas flood

Appendix table II-2 (cont.)--Degree and kind of limitations for building sites, sewage and solid waste disposal systems
St. Francie River Basin

Soil associations	Septic tank absorption field	Sewage lagoons	Sanitary landfill (trench type)	Dwellings without basement	Small commercial building	Local roads and streets
37. Memphis-Netchez						
Memphis	Severe: permeability, slope	Severe: permeability, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Netchez	Severe: permeability, slope	Severe: permeability, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
38. Mantechie-Iuka-Ochlockonee						
Mantechie	Moderate: seasonally high water table Severe: if subject to flooding	Moderate: permeability Severe: if subject to flooding	Severe: seasonally high water table	Moderate: beering capacity Severe: if subject to flooding	Moderate: bearing capacity Severe: if subject to flooding	Moderate: traffic supporting capacity Severe: if subject to flooding
Iuka	Moderate: seasonally high water table Severe: if subject to flooding	Moderate: permeability Severe: if subject to flooding	Severe: seasonally high water table, some areas flood	Moderate: seasonally high water table, moderate bearing capacity Severe: if subject to flooding	Moderate: moderate bearing capacity Severe: if subject to flooding	Moderate: treffic supporting capacity Severe: if subject to flooding
Ochlockonee	Slight: severe if subject to flooding	Severe: permeability	Slight: severe if subject to flooding	Slight: severe if subject to flooding	Slight: severe if subject to flooding	Slight: severe if subject to flooding
39. Alligator-Earle						
Alligator	Severe: permeability, seasonally high water table	Slight: severe if subject to flooding	Severe: texture, seasonally high water table, some areas flood	Severe: seasonally high water table, texture, shrink-swell potential, some areas flood	Severe: ssasonally high water table, shrink-swell potential, corrosivity, some areas flood	Severe: traffic supporting capacity, shrink-swell potential, texture, some areas flood
Earle	Severe: permeability, ssasonally high water table	Slight	Severe: texture, seasonally high water table	Severe: ssasonally high water table, bearing capacity, shrink-swell potential	Severe: seasonally high water table, shrink-swell potsntial, bearing capacity	Severe: shrink-swell potential, traffic supporting cspacity
40. Loring-Memphis-Grenada						
Loring	Severe: permeability	Moderate: slopes 0-7% Severe: slopes 7+%	Moderate: slopes 0-25% Severe: slopes 25+%	Moderate: slopes 2-15%, bearing capacity Severe: slopes 15% and over	Moderate: slopes 2-8% Severe: slopes 8-20% and over	Moderate: slopes 2-15%, traffic supporting capacity Severe: slopes 15-20% and over
Memphis	Slight: slopes 0-8% Moderate: slopes 8-15% Severe: slopes 15+%	Moderate: slopes 0-7%, permeability Severe: slopes 7+%	Moderate: slopes 1-25% Severe: slopes 25+%	Moderate: slopes 0-15%, bearing capacity Severe: slopes 15+%	Moderate: slopes 0-8%, bearing capacity Severe: slopes 8+%	Moderate: slopes 0-15%, traffic supporting capacity Severe: slopes 15+%
Grenada	Severe: permeability	Slight: elopes 0-2% Moderate: slopes 2-7% Severe: slopes 7+%	Moderate: slopes 0-25% Severe: slopes 25+%	Moderate: slopes 0-6%, seasonally high water table Moderate: slopes 6-12%	Moderate: slopes 0-8%, corrosivity Severe: slopes 8+%	Moderate: seasonally high water table, traffic supporting capacity
41. Calloway-Henry						
Calloway	Severe: seasonally high water table, permeability	Slight	Severe: seasonally high water table	Severe: ssasonally high water table	Severe: seasonally high water table, corrosivity	Moderate: seasonally high water teble, traffic supporting capacity
Henry	Severe: seasonally high water table, permsability	Slight	Severe: ssasonally high water table	Severe: seasonally high water table, bearing capacity	Severe: seasonally high water table, bearing capacity	Severe: seesonally high water table, traffic supporting capacity

Appendix table II-3--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
1. Clarksville-Doniphan-Lebanon				
Clarksville	Severe: coarse fragments, slope	Severe: coarse fragments, slope (E&F)	Severe: coarse fragments, slope	Severe: coarse fragments, slope (F)
Doniphan	Moderate: 8 to 15% slopes, coarse fragments on surface Severe: over 15% slopes	Moderate: 8 to 15% slopes, coarse fragments on surface Severe: over 15% slopes	Severe: over 6% slopes, coarse fragments	Moderate: 15 to 25% slopes, coarse fragments Severe: over 25% slopes
Lebanon	Slight: 2 to 8% slopes Moderate: 8 to 14% slopes	Slight: 2 to 8% slopes Moderate: 8 to 14% slopes	Moderate: 2 to 6% slopes Severe: 6 to 14% slopes	Slight
2. Crider-Hagerstown-Bardley				
Crider	Slight: less than 8% slopes Moderate: 8 to 15% slopes	Slight: less than 8% slopes Moderate: 8 to 15% slopes	Moderate: 3 to 6% slopes Severe: over 6% slopes	Slight: less than 15% slopes
Hagerstown	Moderate: 8 to 15% slopes	Moderate: 8 to 15% slopes	Severe: over 6% slopes	Slight
Bardley	Moderate: coarse fragments, slope	Moderate: coarse fragments, slope	Severe: coarse fragments, slope, depth to bedrock	Moderate: coarse fragments
3. Tilsit-Hector				
Tilsit	Slight: 1 to 8% slopes Moderate: 8 to 15% slopes	Slight: 1 to 8% slopes Moderate: 8 to 15% slopes	Slight: 1 to 2% slopes Moderate: 2 to 6% slopes Severe: 6 to 15% slopes	Slight
Hector	Moderate: slope, coarse fragments, trafficability Severe: 8% + slopes, coarse fragments, trafficability	Moderate to severe: coarse fragments, trafficability Severe: 8% + slopes, coarse fragments, trafficability	Severe: depth to bedrock, coarse fragments, trafficability	Slight to moderate: 2 to 15% slopes, coarse fragments Moderate: 15 to 25% slopes Severe: over 25% slopes
4. Midco-Gladden-Sharen				
Midco	Severe: flooding	Moderate: flooding	Moderate: flooding	Slight
Gladden	Slight to severe: some areas flood	Slight to severe: some areas flood	Slight to severe: some areas flood	Slight
Sharen	Slight: unflooded Severe: flooded	Slight: unflooded Severe: flooded	Slight: unflooded Moderate to severe: flooded	Slight

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
5. Unnamed Soils	(DATA NOT AVAILABLE)			
6. Doniphan-Union				
Doniphan	(See Doniphan under No. 1)			
Union	Slight: 3 to 8% slopes Moderate: 8 to 15% slopes Severe: 15 to 20% slopes	Slight: 3 to 8% slopes Moderate: 8 to 15% slopes Severe: 15 to 20% slopes	Moderate: 3 to 8% slopes Severe: 6 to 20% slopes	Slight: 3 to 15% slopes Moderate: 15 to 25% slopes
7. Falaya-Collins				
Falaya	Severe: wetness, flooding	Moderate: wetness, flooding	Severe: wetness, flooding	Moderate: wetness, flooding
Collins	Severe: flooding	Moderate: flooding	Severe: flooding	Slight
8. Calhoun-Wrightsville				
Calhoun	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wrightsville	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
9. Loring-Memphis				
Loring	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: 15 to 20% slopes	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: 15 to 20% slopes	Slight: 2 to 6% slopes, permeability Severe: 6 to 20% slopes	Slight: 2 to 15% slopes Moderate: 15 to 20% slopes
Memphis	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: over 6% slopes	Slight: 0 to 15% slopes Moderate: 15 to 20% slopes Severe: 25 to 40% slopes
10. Gideon-Wardell-Lilbourn				
Gideon	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wardell	Severe: wetness	Severe: wetness	Moderate to severe: wetness	Moderate: wetness
Lilbourn	Moderate to severe: wetness	Moderate: wetness	Moderate to severe: wetness	Moderate: wetness

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
11. Bosket-Broseley				
Bosket	Slight to moderate: no flooding in season of use if leveed	Slight	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: 6 to 8% slopes	Slight
Broseley	Moderate: 0 to 8% slopes, texture Moderate: 8 to 12% slopes, texture	Moderate: 0 to 8% slopes, texture Moderate: 8 to 12% slopes, texture	Moderate: 0 to 2% slopes, sandy Moderate: 2 to 6% slopes, sandy Severe: over 6% slopes	Moderate: texture
12. Sharkey				
Sharkey	Severe: wetness, permeability, texture, flooding on flooded phases	Severe: wetness, texture	Severe: wetness, permeability, texture	Severe: wetness, texture, flooding on flooded phases
13. Dundee				
Dundee	Moderate: wetness, permeability	Moderate: wetness	Moderate: wetness	Moderate: wetness
14. Bosket-Beulah-Broseley				
Bosket	(See Bosket under No. 11)			
Beulah	Slight	Slight	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: 6 to 8% slopes	Slight
Broseley	(See Broseley under No. 11)			
15. Commerce-Crevasse-Caruthersville				
Commerce	Moderate: wetness, permeability Severe: if subject to flooding	Moderate: wetness Severe: if subject to flooding	Moderate: wetness, permeability Severe: if subject to flooding	Moderate: wetness, some areas flood
Crevasse	Moderate to severe: texture	Moderate to severe: texture	Severe: texture	Moderate to severe: texture
Caruthersville	None-slight: if protected Severe: if subject to flooding	Slight: if protected Moderate: flooding	Slight: if protected Moderate: flooding	None-slight: if protected Moderate: flooding

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
16. Hayti-Portageville-Cooter				
Hayti	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Portageville	Severe: wetness	Severe: wetness, texture	Severe: wetness, texture	Severe: wetness, texture
Cooter	Severe: texture, occasional flooding	Severe: texture	Severe: over 6% slopes, texture, occasional flooding	Severe: texture, flooding
17. Lilbourn-Crevasse-Canalou				
Lilbourn	(See Lilbourn under No. 10)			
Crevasse	(See Crevasse under No. 15)			
Canalou	(NO DATA AVAILABLE)			
18. Gideon-Roellen-Sikeston				
Gideon	(See Gideon under No. 10)			
Roellen	Severe: wetness, texture, permeability, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, permeability, some areas flood	Severe: wetness, texture, some areas flood
Sikeston	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
19. Amagon-Fountain-Beulah				
Amagon	(See Amagon under No. 16)			
Fountain	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Beulah	(See Beulah under No. 17)			
20. Loring-Memphis				
Loring	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Moderate: 2 to 6% slopes Severe: 6 to 20% slopes	Slight: 2 to 15% slopes Moderate: over 15% slopes
Memphis	(See Memphis under No. 37)			

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
21. Calhoun-Calloway-Fountain				
Calhoun	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Calloway	(See Calloway under No. 34)			
Fountain	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
22. Dubbs-Bosket-Beulah				
Dubbs	(See Dubbs under No. 27)			
Bosket	Slight	Slight	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes	Slight
Beulah	Slight	Slight	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes	Slight
23. Commerce-Robinsonville-Convent				
Commerce	Moderate: wetness, permeability Severe: if subject to flooding	Moderate: wetness Severe: if subject to flooding	Moderate: wetness, permeability Severe: if subject to flooding	Moderate: wetness, some areas subject to flooding
Robinsonville	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding	Slight
Convent	Moderate: wetness Severe: if subject to flooding	Moderate: wetness Severe: if subject to flooding	Moderate: wetness Severe: if subject to flooding	Moderate: wetness Severe: if subject to flooding
24. Sharkey-Tunica				
Sharkey	(See Sharkey under No. 36)			
Tunica	Severe: wetness, texture, permeability, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, texture, permeability, some areas flood	Severe: wetness, texture, some areas flood
25. Sharkey-Steele				
Sharkey	(See Sharkey under No. 36)			
Steele	Severe: trafficability, some areas flood	Severe: trafficability, some areas flood	Severe: trafficability, some areas flood	Moderate: some areas flood

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
26. Amagon-Dundee-Crevasse				
Amagon	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Dundee	(See Dundee under No. 27)			
Crevasse	(See Crevasse under No. 15)			
27. Dundee-Dubbs				
Dundee	Moderate: wetness, permeability	Moderate: wetness	Moderate: wetness	Moderate: wetness
Dubbs	Slight	Slight	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: 6 to 8% slopes	Slight
28. Henry-Calhoun-Calloway				
Henry	(See Henry under No. 41)			
Calhoun	Severe: wetness	Severe: wetness	Severe: wetness	
Calloway	(See Calloway under No. 41)			
29. Hillemann-Henry				
Hillemann	Moderate: wetness, permeability	Moderate: wetness	Moderate: wetness, permeability	Moderate: wetness
Henry	(See Henry under No. 41)			
30. Alligator-Earle-Sharkey				
Alligator	Severe: permeability, texture, some areas flood, wetness	Severe: wetness, texture, some areas flood	Severe: wetness, permeability, clayey, some areas flood	Severe: wetness, texture, some areas flood
Earle	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, texture
Sharkey	(See Sharkey under No. 36)			

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
31. Arkabutla-Collins				
Arkabutla	Moderate: wetness Severe: if subject to flooding	Moderate: wetness, some areas flood	Moderate: wetness Severe: if subject to flooding	Moderate: wetness, some areas subject to flooding
Collins	Severe: flooding	Severe: flooding	Severe: flooding	Slight
32. Mhoon-Dundee				
Mhoon	Severe: wetness, some areas flood	Severe: wetness, some areas flood	Severe: wetness, some areas flood	Severe: wetness, some areas flood
Dundee	(See Dundee under No. 27)			
33. Alligator-Sharkey				
Alligator	(See Alligator under No. 30)			
Sharkey	(See Sharkey under No. 36)			
34. Calloway-Loring-Henry				
Calloway	(See Calloway under No. 41)			
Loring	(See Loring under No. 20)			
Henry	(See Henry under No. 41)			
35. Zachary-Tichnor				
Zachary and Tichnor	Severe: wetness, flooding	Severe: wetness, flooding	Severe: wetness, flooding	Severe: wetness, flooding
36. Newellton-Sharkey-Tunica				
Newellton	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood
Sharkey	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, texture, some areas flood
Tunica	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
37. Memphis-Natchez				
Memphis	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: over 6% slopes	Slight: 0 to 15% slopes Moderate: 15 to 25% slopes Severe: 25 to 40% slopes
Natchez	Moderate: 12 to 15% slopes Severe: 15% slopes and over	Severe: 15% slopes and over	Severe: slopes	Moderate: 12 to 25% slopes Severe: 25% slopes and over
38. Mantachie-Iuka-Ochlockonee				
Mantachie	Severe: wetness, some areas flood	Severe: wetness, some areas flood	Severe: wetness, some areas flood	Moderate: wetness, some areas flood
Iuka	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding	Slight Severe: if subject to flooding
Ochlockonee	Slight Severe: if subject to flooding	Slight Moderate: if subject to flooding	Slight Moderate: if subject to flooding	Slight Moderate: if subject to flooding
39. Alligator-Earle				
Alligator	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, permeability, texture, some areas flood	Severe: wetness, texture, some areas flood
Earle	Severe: wetness, texture, some areas flood	Severe: wetness, texture, some areas flood	Severe: wetness, permeability, texture	Severe: wetness, texture
40. Loring-Memphis-Grenada				
Loring	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 2 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Moderate: 2 to 6% slopes Severe: over 6% slopes	Slight: 2 to 15% slopes Moderate: over 15% slopes
Memphis	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 8% slopes Moderate: 8 to 15% slopes Severe: over 15% slopes	Slight: 0 to 2% slopes Moderate: 2 to 6% slopes Severe: over 6% slopes	Slight: 0 to 15% slopes Moderate: 15 to 25% slopes Severe: 25 to 40% slopes
Grenada	Moderate: wetness, permeability	Moderate: wetness	Moderate: 0 to 6% slopes Severe: over 6% slopes, wetness, permeability	Slight

Appendix table II-3 (cont.)--Degree and kind of limitations for selected recreational uses of soils
St. Francis River Basin

Soil associations	Camp areas	Picnic areas	Playgrounds	Path and trails
41. Calloway-Henry				
Calloway	Moderate: wetness, permeability	Moderate: wetness	Moderate: wetness, permeability	Moderate: wetness
Henry	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness

Appendix table II-4--Average yields per acre of principal crops 1/
St. Francis River Basin

Soil Associations	Corn	Rice	Cotton	Soybeans	Wheat
	(bu.)	(bu.)	(L-lb.)	(bu.)	(bu.)
1. Clarksville-Doniphan-Lebanon					
Clarksville	-	-	-	-	20
Doniphan	-	-	-	-	28
Lebanon	30-55	-	-	-	28-35
2. Crider-Hagerstown-Bardley					
Crider	56-90	-	-	20-35	20-40
Hagerstown	65-75	-	-	-	25-30
Bardley	-	-	-	-	20
3. Tilsit-Hector					
Tilsit	70-75	-	450-500	-	-
Hector	-	-	-	-	20-25
4. Midco-Gladden-Sharen					
Midco	40	-	-	-	30
Gladden	70	-	-	-	43
Sharen	100-125	-	-	40	40
5. Unnamed Soil	(No available data)				
6. Doniphan-Union					
Doniphan	-	-	-	-	-
Union	50-70	-	-	-	25-40
7. Falaya-Collins					
Falaya	100	-	700	35-40	-
Collins	95	-	800	35	40
8. Calhoun-Wrightsville					
Calhoun	-	120	400	25	-
Wrightsville	-	90	450	25	-
9. Loring-Memphis					
Loring	60-90	-	500-700	20-30	32-40
Memphis	65-100	-	600-800	25-35	30-40
10. Gideon-Wardell-Lilbourn					
Gideon	85-95	-	720-750	40-42	-
Wardell	70-80	70	600-675	-	-
Lilbourn	75-120	-	500-700	30-45	-
11. Bosket-Broseley					
Bosket	75-85	-	650-725	28-32	30-40
Broseley	55-70	-	400-500	25-35	-
12. Sharkey					
Sharkey	-	120	500-550	30-35	-
13. Dundee					
Dundee	80-85	-	700-750	35-40	-
14. Bosket-Beulah-Broseley					
Bosket	75-85	-	650-725	28-32	30-40
Beulah	55-65	-	450-500	30-35	35-40
Broseley	55-70	-	400-500	25-35	-
15. Commerce-Crevasse-Caruthersville					
Commerce	85-95	-	800-900	35-40	-
Crevasse	-	-	-	-	-
Caruthersville	110	-	900	45	-
16. Hayti-Portageville-Cooter					
Hayti	90	95	700	40	-
Portageville	50-65	90	550	35-40	-
Cooter	55	-	400	25	-

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Appendix table II-4 (cont.)--Average yields per acre of principal crops 1/
St. Francis River Basin

Soil Associations	Corn	Rice	Cotton	Soybeans	Wheat
	(bu.)	(bu.)	(L-lb.)	(bu.)	(bu.)
17. Lilbourn-Crevasse-Canalou					
Lilbourn	75-120	-	500-700	30-45	-
Canalou	(Data not available)				
Crevasse	-	-	-	-	-
18. Gideon-Roellen-Sikeston					
Gideon	85-95	-	720-750	40-42	-
Roellen	-	90	-	35	-
Sikeston	85	-	720	40	-
19. Amagon-Fountain-Beulah					
Amagon	-	-	600-650	30-35	35-40
Fountain	-	90-110	600-650	20-25	-
Beulah	-	-	500-600	30-35	40-45
20. Loring-Memphis					
Loring	60-90	-	500-700	20-30	32-40
Memphis	65-100	-	600-800	25-35	30-40
21. Calhoun-Calloway-Fountain					
Calhoun		100-130	375-400	20-25	30-35
Calloway		100-130	600-650	30-35	30-35
Fountain		90-110	400-475	20-25	25-30
22. Dubbs-Bosket-Beulah					
Dubbs		-	750-850	30-40	35-45
Bosket		-	650-725	30-35	35-45
Beulah		-	500-600		35-45
23. Commerce-Robinsonville					
Commerce		-	800-900	35-40	35-45
Robinsonville		-	750-825	35-40	35-45
24. Sharkey-Tunica					
Sharkey		100-130	500-550	30-35	30-35
Tunica		-	575-625	30-35	35-40
25. Sharkey-Steel					
Sharkey		100-130	500-550	30-35	30-35
Steele		-	550-600	35-40	35-40
26. Amagon-Dundee-Crevasse					
Amagon		-	600-650	30-35	35-40
Dundee		-	700-750	35-40	35-45
Crevasse		-	-	-	25-30
27. Dundee-Dubbs					
Dundee		-	700-750	35-40	35-45
Dubbs		-	750-850	30-40	35-45
28. Henry-Calhoun-Calloway					
Henry		100-130	400-475	30-35	30-35
Calhoun		100-130	375-400	20-25	30-35
Calloway		100-130	600-650	30-35	30-35
29. Hillemann-Henry					
Hillemann		100-130	600-650	30-35	30-35
Henry		100-130	400-475	30-35	30-35
30. Alligator-Earle-Sharkey					
Alligator		100-130	450-600	25-35	30-35
Earle		-	650-700	30-35	30-45
Sharkey		100-130	500-550	30-35	30-35
31. Arkabutla-Collins					
Arkabutla		-	650-700	30-35	30-35
Collins		-	750-800	35-40	35-40

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Appendix table II-4 (cont.)--Average yields per acre of principal crops 1/
St. Francis River Basin

Soil Associations	Corn	Rice	Cotton	Soybeans	Wheat
	(bu.)	(bu.)	(L-lb.)	(bu.)	(bu.)
32. Mhoon-Dundee					
Mhoon		-	650-700	30-35	35-40
Dundee		-	700-750	35-40	35-45
33. Alligator-Sharkey					
Alligator		100-130	450-600	25-35	30-35
Sharkey		100-130	500-550	30-35	30-35
34. Calloway-Loring-Henry					
Calloway		100-130	600-650	30-35	30-35
Loring		-	500-700	25-30	30-35
Henry		100-130	400-475	25-30	30-35
35. Zachary-Tichnor					
Zachary		-	-	15-20	-
Tichnor		-	-	15-20	-
36. Newellton-Sharkey-Tunica					
Newellton		-	575-800	30-35	40-45
Sharkey		100-130	500-550	30-35	30-35
Tunica		-	575-625	30-35	35-40
37. Memphis-Natchez					
Memphis		-	-	-	-
Natchez		-	-	-	-
38. Mantachie-Iuka-Och ckonee					
Mantachie		-	600-625	30-35	30-35
Iuka		-	500-575	25-30	30-35
Och ockonee		-	600-675	30-35	25-30
39. Alligator-Earle					
Alligator		100-130	450-600	25-35	30-35
Earle		-	650-700	30-35	30-45
40. Loring-Memphis					
Loring		-	-	-	-
Memphis		-	-	-	-
41. Calloway-Henry					
Calloway		100-130	600-650	30-35	30-35
Henry		100-130	400-475	25-30	30-35

1/ Source of data, county soil surveys.

Appendix table II-5--Land use by watersheds
St. Francis River Basin, Arkansas and Missouri

Number	Cropland	Grassland	Forest land	Water	Other	Watershed Area	
	Acres	Acres	Acres	Acres	Acres	Acres	Sq. Mi.
			Above Wappapello Reservoir				
5-1	27,180	61,545	122,600	520	11,515	223,360	349.0
5-2	16,015	15,458	52,530	655	4,302	88,960	139.0
5-3	9,200	44,840	114,890	660	3,850	173,440	271.0
5-4	8,488	25,547	88,450	315	3,280	126,080	197.0
5-5	6,224	38,460	136,540	8,976	5,640	195,840	306.0
5-5a	2,000	7,100	21,500	-	120	30,720	48.0
Subtotal	69,107	192,950	536,510	11,126	28,707	838,400	1,310.0
			Main Stem Below Wappapello Reservoir				
5-7	118,700	23,220	58,480	8,620	7,940	216,960	339.0
5-8	51,530	1,380	3,160	440	2,370	58,880	92.0
5-9	13,195	3,760	1,880	505	500	19,840	31.0
5-10	50,366	6,400	6,268	90	7,020	70,144	109.6
5-11	64,668	320	295	-	3,837	69,120	108.0
5-11a	24,950	460	120	-	1,350	26,880	42.0
5-12	65,676	160	290	130	560	66,816	104.4
5-13	94,960	12,600	19,200	920	9,280	136,960	214.0
5-14	40,533	2,500	5,600	68	1,219	49,920	78.0
5-15	184,908	1,150	577	401	19,044	206,080	322.0
5-15a	26,800	350	700	40	2,830	30,720	48.0
5-15b	40,845	475	730	500	2,250	44,800	70.0
5-16	45,004	480	147	1,042	12,207	58,880	92.0
5-17	17,331	336	48	370	603	18,688	29.2
5-19	220,484	1,261	600	4,166	12,081	238,592	372.8
5-20	26,169	2,183	48,118	3,870	300	80,640	126.0
5-21	162,674	8,240	8,950	618	14,526	195,008	304.7
5-22	32,540	5,992	8,380	720	3,760	51,392	80.3
5-23	55,732	12,025	43,789	2,094	5,400	119,040	186.0
5-24	79,189	346	1,360	2,085	4,060	87,040	136.0
5-25	94,340	132	640	1,103	8,105	104,320	163.0
5-26	56,301	327	490	811	4,791	62,720	98.0
5-27	49,717	1,284	4,272	2,918	4,529	62,720	98.0
5-28	82,360	444	2,370	1,779	3,927	90,880	142.0
5-29	47,397	260	710	1,030	2,443	51,840	81.0
5-30	61,805	-	3,300	205	1,250	66,560	104.0
5-31	68,441	394	1,355	871	4,459	75,520	118.0
5-32	36,473	941	650	643	10,573	49,280	77.0
5-33	56,393	856	5,334	768	2,825	66,176	103.4
5-33a	27,466	578	4,200	2,486	1,494	36,224	56.6
5-34	66,319	200	23,117	3,044	1,400	94,080	147.0
5-35	-	50	24,235	1,815	1,420	27,520	43.0
5-35a	1,000	300	12,200	500	2,000	16,000	25.0
Subtotal	2,064,266	89,404	291,565	44,652	160,353	2,650,240	4,141.0

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Appendix table II-5 (cont.)--Land use by watersheds
St. Francis River Basin, Arkansas and Missouri

Number	Cropland	Grassland	Forest land	Water	Other	Watershed Area	
	Acres	Acres	Acres	Acres	Acres	Acres	Sq. Mi.
			Little River System				
5a-0	-	970	3,455	4,500	35	8,960	14.0
5a-1	118,306	12,500	12,790	24	6,780	150,400	235.0
5a-3	4,870	1,120	3,200	40	370	9,600	15.0
5a-5	93,478	9,100	10,590	1,272	3,960	118,400	185.0
5a-6	77,687	1,900	2,880	3	2,650	85,120	133.0
5a-7	174,200	2,250	1,880	220	16,650	195,200	305.0
5a-8	163,965	4,525	4,740	90	11,640	184,960	289.0
5a-9	115,670	1,150	1,240	200	11,020	129,280	202.0
5a-10	180,223	870	745	1,299	13,983	197,120	308.0
5a-11	116,860	550	650	180	7,840	126,080	197.0
5a-11a	-	780	22,026	1,667	487	24,960	39.0
5a-12	74,513	940	1,640	1,823	4,284	83,200	130.0
Subtotal	1,119,772	36,655	65,836	11,318	79,699	1,313,280	2,052.0
			L'Anguille River				
5b-1	11,422	2,000	6,302	266	3,690	23,680	37.0
5b-2	31,668	500	2,167	105	1,400	35,840	56.0
5b-3	28,750	1,517	6,946	102	6,845	44,160	69.0
5b-4	25,215	300	4,600	135	1,110	31,360	49.0
5b-5	36,092	2,400	11,400	128	6,300	56,320	88.0
5b-6	25,357	3,700	11,847	130	1,206	42,240	66.0
5b-7	50,220	2,560	2,680	46	1,454	56,960	89.0
5b-8	25,239	3,600	5,600	446	4,795	39,680	62.0
5b-9	47,517	10,160	13,160	95	2,668	73,600	115.0
5b-10	60,263	650	7,600	130	3,037	71,680	112.0
5b-11	46,284	-	8,000	915	2,401	57,600	90.0
5b-12	50,370	1,868	10,780	728	3,454	67,200	105.0
Subtotal	438,397	29,255	91,082	3,226	38,360	600,320	938.0
Total	3,691,542	348,264	984,993	70,322	307,119	5,402,240	8,441.0

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Appendix table II-6--Channel classification, St. Francis River Basin

Wshd. Number	Type of work 1/					Type of channel before project 2/			Flow condition 3/			
	I	II	III	IV	V	M	N	O	PR	I	E	S
	-Miles-											
5-9		17				17					17	
5-11		46			35	81			6	42	33	
5-12		24			26	47	3			7	43	
5-15		82			174	256			25	23	208	
5-15b		32			40	72			5	12	55	
5-16		13			23	36				3	33	
5-21		105			120	225			20	40	165	
5-25		28			48	65	11				76	
5-29		36			58	91	3		6	14	74	
5-31		34	22		72	92	36		30	13	85	
5a-6		29			66	95			49	39	7	
5a-11		112			113	208	17		65	59	101	
5a-12		18			28	46				10	36	
5b-7		52			5	57			11	16	30	
5b-10		53			17	70			21	9	40	
5b-11		35			11	46			3	11	32	
5b-12		22			11	33				13	20	

1/ I - Establishment of new channel including necessary stabilization measures. II - Enlargement or realinement of existing channel or stream. III - Cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation). IV - Clearing and removal of loose debris within channel section. V - Stabilization as primary purpose (by continuous treatment or localized problem areas - present capacity adequate).

2/ M - Manmade ditch or previously modified channel. N - An unmodified, well-defined natural channel or stream. O - None or practically no defined channel.

3/ Pr - Perennial - flows at all times except during extreme drought. I - Intermittent - Continuous flow through some seasons of the year but little or no flow through other seasons. E - Ephemeral - flows only during periods of surface runoff, other dry. S - Ponded water with no noticeable flow - caused by lack of outlet or high ground water table.

Appendix table II-6a--Classification of channels
St. Francis River Basin

Watershed	Type of channel 1/			Flow condition 2/		
	M	N	O	Pr	I	E
	- - - - - - - - - Miles - - - - - - - - - -					
St. Francis River Below Wappapello						
5-7	58			15	13	30
5-11a	36				12	24
5-13	51			8	21	22
5-14	37			10	14	13
5-19	367			121	91	155
5-26	78	11		4	27	58
5-27	67			16	10	41
5-33	13	37		17	20	13
Little River						
5a-1	143			67	50	26
5a-5	50			18	12	20
5a-7	188			74	92	22
5a-8	229			148	71	10
5a-9	105			28	40	37
5a-10	256			50	61	145

1/ See footnote 2, table II-6.
2/ See footnote 3, table II-6.

Appendix table II-6b--Channel classification by watersheds
St. Francis River Basin 1/

Wshd. No.	PR	I	E	S
5-1	45	150	200	
5-2	40	100	150	
5-3	65	120	150	
5-4	30	100	100	
5-5	60	100	100	60
5-5a		15	50	
5-20	80	60	50	50
5-23	50	75	100	30
5-24	40	100	100	30
5-28	25	60	40	10
5-30	35	30	75	5
5-32	10	30	60	10
5-34	50	50	100	30
5-35	20	25	30	
5-35a		15	30	5
5a-0				
5a-3		25	20	
5a-11a				35
5b-1	12	40	50	
5b-3	13	30	50	
5b-4	5	10	30	
5b-5	20	35	30	
5b-6	12	40	30	
5b-9	11	16	30	

1/ See footnote 3, table II-6.

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Appendix table II-7--Estimated use of ground water by principal use - 1970
St. Francis River Basin (million gallons per day)

County	Public Supply	Self Supplied Industry	Rural Use Domestic	Rural Use Livestock	Irrigation Rice	Irrigation Other Crops	Fish & Minnow Farms	Recreation & Wildlife Impoundments	Fuel-Electric Power	County Totals
Clay	.48	0	.19	.06	4.77	.55	0	0	0	6.05
Craighead	3.72	.72	1.05	.11	12.63	15.87	.23	0	0	34.33
Crittenden	3.54	.05	1.02	.08	27.98	5.05	.98	0	0	38.70
Cross	1.04	1.22	.70	.14	85.99	6.63	2.46	0	0	98.18
Greene	1.84	.15	.60	.13	6.80	0	.32	0	0	9.84
Lee	.58	0	.44	.07	9.88	2.43	.04	0	0	13.44
Mississippi	4.83	6.96	1.13	.10	3.99	.39	1.19	.01	0	18.60
Phillips	0	0	.01	0	0	0	0	0	.72	.73
Poinsett	1.74	.29	.80	.06	78.44	22.16	.80	0	0	104.29
St. Francis	1.82	.30	.99	.16	41.18	8.88	2.26	0	.38	55.97
Woodruff	.03	.01	.02	.01	2.00	.08	.30	0	0	2.45
Arkansas county totals	19.62	9.70	6.95	.92	273.66	62.04	8.58	.01	1.10	382.58
Bollinger	.01	0	.04	.01	0	.02	.08	0	0	.16
Butler	0	0	.01	0	0	0	.58	0	0	.59
Cape Girardeau	.03	0	.08	0	0	0	.08	0	0	.19
Dunklin	1.78	.06	.56	.03	0	6.08	.08	.02	0	8.61
Iron	.29	10.90	.16	.01	0	0	0	0	0	11.36
Madison	.29	0	.10	.02	0	0	0	0	0	.41
New Madrid	.94	0	.34	.02	.25	8.45	0	0	0	10.00
Pemiscot	1.97	0	.40	.01	3.00	1.34	.08	0	0	6.80
St. Francois	1.22	23.50	.24	.02	0	0	0	0	0	24.98
Ste. Genevieve	.03	0	.02	0	0	0	0	0	0	.05
Scott	1.00	0	.19	.04	.60	4.60	0	0	0	6.43
Stoddard	1.23	.37	.66	.11	4.54	14.54	.58	.02	0	22.05
Wayne	.23	0	.17	.01	0	0	.08	0	0	.49
Missouri county totals	9.02	34.83	2.97	.28	8.39	35.03	1.56	.04	0	92.12
Basin totals - million gal. per day	28.64	44.53	9.92	1.20	282.05	97.07	10.14	.05	1.10	474.70
acre-feet per year	32,077	49,873	11,110	1,344	315,896	108,718	11,357	56	1,232	531,663

Appendix table II-8--Cities and towns with population over 100 that utilize ground water for municipal use, St. Francis River Basin

Counties and towns	Population
Arkansas portion of basin	
Clay County	
Patterson	417
Piggott	3,087
Rector	1,990
St. Francis	297
Greenway	240
Craighead County	
Bay	751
Black Oaks	272
Brookland	465
Caraway	952
Farville	350
Jonesboro	27,050
Lake City	948
Lakeview	200
Monette	1,076
Crittenden County	
Crawfordsville	831
Earle	3,146
Gilmore	461
Heafer-Black Oak	300
Marion	1,634
Turrell	783
West Memphis	25,892
Cross County	
Cherry Valley	556
Hickory Ridge	410
Parkin	1,731
Wynne	6,696
Greene County	
Alexander	297
Center Hill	1,201
Marmaduke	821
Paragould	10,639
Lee County	
Marianna	6,196

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Appendix table II-8 (cont.)--Cities and towns with population over 100 that utilize ground water for municipal use, St. Francis River Basin

Counties and towns	Population
Arkansas portion of basin (cont.)	
Mississippi County	
Armorel	150
Bassett	265
Blytheville	24,752
Burdett	173
Dell	358
Dogwood	300
Dyess	433
Gosnell	1,386
Grider-Driver	350
Joiner	839
Keiser	688
Leachville	1,582
Little River	400
Luxora	1,566
Manila	1,961
Osceola	7,204
West Ridge	160
Wilson	1,009
Yarbro	300
Phillips County	
Helena	10,415
St. Francis County	
Caldwell	292
Forrest City	12,521
Hughes	1,872
Madison	984
Widener	292
Poinsett County	
Black Oak	272
Fisher	361
Harrisburg	1,931
Lepanto	1,846
Marked Tree	3,208
Payneway	190
Trumann	5,938
Tyronza	510
Weiner	715

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Appendix table II-8 (cont.)--Cities and towns with population over 100 that utilize ground water for municipal use, St. Francis River Basin

Counties and towns	Population
Missouri portion of basin	
Stoddard County	
Advance City	903
Bell City	424
Bernie	1,641
Bloomfield	1,584
Dexter	6,024
Dudley	248
Essex	1,040
Grayridge	250
Puxico	759
Dunklin County	
Arbyrd	575
Campbell	1,979
Cardwell	886
Clarkton	1,177
Holcomb	593
Hornersville	693
Kennett	9,852
Malden	5,374
Senath	1,484
Scott County	
Benton	640
Chaffee	2,793
Kelso	401
Miner	640
Morley	528
Oran	1,226
Scott City	2,464
Sikeston	14,690
Vanduser	306
Iron County	
Annapolis	330
Arcadia	627

Appendix table II-8 (cont.)--Cities and towns with population over 100 that utilize ground water for municipal use, St. Francis River Basin

Counties and towns	Population
Missouri portion of basin (cont.)	
New Madrid County	
Gideon	1,112
Howardville	500
Lilbourn	1,152
Marston	666
Matthews	538
Morehouse	1,332
New Madrid	2,719
North Lilbourn	334
Parma	1,051
Point Pleasant	115
Portageville	3,113
Risco	412
Pemiscot County	
Braggadocio	400
Bragg City	210
Caruthersville	7,350
Cooter	414
Deering	138
Hayti	3,841
Holland	329
Pascula	180
Homestown	273
Steele	2,107
Wardell	275
St. Francois County	
Bismarck	1,387
Farmington	6,590
Cape Girardeau County	
Delta	462
Wayne County	
Greenville	321

Appendix table II-9--Fish species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Fishes found throughout the basin

1. Chestnut Lamprey
2. Southern Brook Lamprey
3. Shortnose Gar
4. Spotted Gar
5. Longnose Gar
6. Bowfin
7. Gizzard Shad
8. Grass Pickerel
9. European Carp
10. Creek Chub
11. Emerald Shiner
12. Redfin Shiner
13. Northern Studfish
14. Bluntnose Minnow
15. Northern Redhorse
16. River Redhorse
17. Black Bullhead
18. Yellow Bullhead
19. Channel Catfish
20. Stoneroller
21. Black Redhorse
22. Creek Chubsucker
23. Blackspotted Topminnow
24. Mosquitofish
25. Brook Silverside
26. Largemouth Bass
27. Green Sunfish
28. Longear Sunfish
29. Bluegill
30. Rock Bass
31. Sauger
32. Dusky Darter
33. Rainbow Darter

II Fishes found only in the Ozark Highland Major Land Resource Area

1. Least Brook Lamprey
2. Hornyhead Chub
3. Southern Redbelly Dace
4. Rosyface Shiner
5. Telescope Shiner
6. Bleeding Shiner
7. Striped Shiner
8. Bigeye Shiner
9. Steelcolor Shiner
10. Ozark Minnow
11. Slim Minnow
12. Largescale Stoneroller
13. Hogsucker
14. Golden Redhorse
15. Slender Madtom
16. Ozark Madtom
17. Smallmouth Bass
18. Walleye
19. Log Perch
20. Gilt Darter
21. Johnny Darter
22. Banded Darter
23. Greenside Darter
24. Orangethroat Darter
25. Fantail Darter
26. Banded Sculpin

III Fishes found only in the Southern Mississippi Valley Alluvium MLRA and in the Southern Mississippi Valley Silty Uplands MLRA

1. American Eel
2. Goldeye
3. Golden Shiner
4. Pugnose Minnow
5. Suckermouth Minnow
6. Ribbon Shiner
7. Ironcolor Shiner
8. Weed Shiner
9. Blacktail Shiner
10. Red Shiner
11. Mimic Shiner
12. Ghost Shiner
13. Central Silvery Minnow
14. Cypress Minnow
15. Fathead Minnow
16. Bullhead Minnow
17. Bigmouth Buffalofish
18. Smallmouth Buffalofish
19. Black Buffalofish
20. River Carpsucker
21. Spotted Sucker
22. Lake Chubsucker
23. Brown Bullhead
24. Blue Catfish
25. Tadpole Madtom
26. Freckled Madtom
27. Stonecat
28. Brindled Madtom
29. Flathead Catfish
30. Pirate Perch
31. Starhead Topminnow
32. Blackstripe Topminnow
33. White Bass
34. Yellow Bass
35. Spotted Bass
36. Redear Sunfish
37. Warmouth
38. Bantam Sunfish
39. Spotted Sunfish
40. Orangespotted Sunfish
41. Black Crappie
42. White Crappie
43. Flier
44. Banded Pygmy Sunfish
45. Eastern Swamp Darter
46. Blackside Darter
47. River Darter
48. Stargazing Darter
49. Crystal Darter
50. Western Sand Darter
51. Scaly Sand Darter
52. Bluntnose Darter
53. Speckled Darter
54. Harlequin Darter
55. Mud Darter
56. Slough Darter
57. Cypress Darter
58. Freshwater Drum

1/ Common names taken from Pflieger's A Distributional Study of Missouri Fishes.

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Appendix table II-10--Amphibian species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Amphibians found throughout the basin

Salamanders

1. Western Lesser Siren
2. Central Newt
3. Spotted Salamander
4. Small-Mouthed Salamander
5. Marbled Salamander
6. Eastern Tiger Salamander
7. Mudpuppy

Toads and Frogs

1. Eastern Spadefoot
2. Dwarf American Toad
3. Fowler's Toad
4. Northern Spring Peeper
5. Eastern Gray Treefrog
6. Western Bird-Voiced Treefrog
7. Green Treefrog
8. Eastern Narrow-Mouthed Toad
9. Blanchard's Cricket Frog
10. Pickerel Frog
11. Green Frog
12. Southern Leopard Frog
13. Bullfrog
14. Crawfish Frog

II Amphibians found only in the Ozark Highland Major Land Resource Area

Salamanders

1. Ozark Hellbender
2. Red-Backed Salamander
3. Slimy Salamander
4. Dark-Sided Salamander
5. Long-Tailed Salamander
6. Cave Salamander
7. Grotto Salamander

Toads and Frogs

1. Western Chorus Frog

III Amphibians found only in the Southern Mississippi Valley Alluvium MLRA and the Southern Mississippi Valley Silty Uplands MLRA

Salamanders

1. Three-toed Amphiuma
2. Red River Waterdog
3. Mole Salamander
4. Greater Siren

Toads and Frogs

1. Northern Cricket Frog
2. Upland Chorus Frog
3. Bronze Frog
4. Southern Chorus Frog

1/ Common names taken from Conant's A Field Guide to Reptiles and Amphibians

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Appendix table II-11--Reptile species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Reptiles found throughout the basin

Turtles

1. Common Snapping Turtle
2. Alligator Snapping Turtle
3. Stinkpot
4. Three-toed Box Turtle
5. Map Turtle
6. Mississippi Map Turtle
7. Ouachita Map Turtle
8. Missouri Slider
9. Slider
10. Red-eared Turtle
11. Western Spiny Soft-Shelled Turtle
12. Smooth Soft-Shelled Turtle
13. Ornate Box Turtle

Lizards

1. Northern Fence Lizard
2. Glass "Snake"
3. Six-lined Racerunner
4. Ground Skink
5. Five-lined Skink
6. Broad-headed Skink
7. Southern Coal Skink

Snakes

1. Granham's Water Snake
2. Diamond-backed Water Snake
3. Midland Brown Snake
4. Northern Red-Bellied Snake
5. Western Ribbon Snake
6. Eastern Garter Snake
7. Rough Earth Snake
8. Western Earth Snake
9. Eastern Hognose Snake
10. Western Worm Snake
11. Rough Green Snake
12. Prairie King Snake
13. Speckled King Snake
14. Red Milk Snake
15. Northern Copperhead
16. Western Cottonmouth
17. Great Plain Rat Snake
18. Black Rat Snake

II Reptiles found only in the Ozark Highland Major Land Resource Area

Turtles

1. Western Painted Turtle

Lizards

1. Eastern Collared Lizard

Snakes

1. Midland Water Snake
2. Prairie Ringneck Snake
3. Eastern Yellow-bellied Racer
4. Eastern Coachwhip
5. Northern Flat-head Snake
6. Western Pygmy Rattlesnake
7. Timber Rattlesnake

III Reptiles found only in the Southern Mississippi Valley Alluvium MLRA and the Southern Mississippi Valley Silty Uplands MLRA

Turtles

1. Mississippi Mud Turtle
2. Southern Painted Turtle
3. Western Chicken Turtle

Snakes

1. Green Water Snake
2. Yellow-Bellied Water Snake
3. Broad-Banded Water Snake
4. Western Mud Snake
5. Southern Black Racer
6. Gray Rat Snake
7. Scarlet Snake
8. Mississippi Ringneck Snake
9. Southern Copperhead
10. Canebrake Rattlesnake

1/ Common names taken from Conant's A Field Guide to Reptiles and Amphibians

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Appendix table II-12--Permanent resident bird species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Birds found throughout the basin

1. Wood Duck
2. Turkey Vulture
3. Sharp-Shinned Hawk
4. Cooper's Hawk
5. Red-Shouldered Hawk
6. Sparrow Hawk
7. Bobwhite
8. Wild Turkey
9. Kildeer
10. American Woodcock
11. Rock Dove
12. Mourning Dove
13. Roadrunner
14. Barn Owl
15. Screech Owl
16. Great Horned Owl
17. Barred Owl
18. Belted Kingfisher
19. Yellow-Shafted Flicker
20. Pileated Woodpecker
21. Red-bellied Woodpecker
22. Red-headed Woodpecker
23. Hairy Woodpecker
24. Downy Woodpecker
25. Horned Lark
26. Blue Jay
27. Common Crow
28. Carolina Chickadee
29. Tufted Titmouse
30. White-breasted Nuthatch
31. Bewick's Wren
32. Carolina Wren
33. Mockingbird
34. Brown Thrasher
35. Robin
36. Eastern Bluebird
37. Loggerhead Shrike
38. Starling
39. House Sparrow
40. Eastern Meadowlark
41. Redwinged Blackbird
42. Common Grackle
43. Brown-headed Cowbird
44. Cardinal
45. Rufous-sided Towhee
46. Field Sparrow

II Birds found only in the Ozark Highland Major Land Resource Area

1. Bald Eagle

III Birds found only in the Southern Mississippi Valley Alluvium MLRA and in the Southern Mississippi Valley Silty Uplands MLRA

1. Long-billed Marsh Wren
2. Short-billed Marsh Wren
3. Pine Warbler

1/ Common names taken from Peterson's A Field Guide to the Birds

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Appendix table II-13--Summer resident bird species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Birds found throughout the basin

1. Green Heron
2. Yellow-crowned Night Heron
3. Yellow-billed Cuckoo
4. Chuck-will's-widow
5. Whip-poor-will
6. Nighthawk
7. Chimney Swift
8. Ruby-throated Hummingbird
9. Eastern Kingbird
10. Great Crested Flycatcher
11. Eastern Phoebe
12. Acadain Flycatcher
13. Eastern Wood Pewee
14. Bank Swallow
15. Rough-winged Swallow
16. Barn Swallow
17. Cliff Swallow
18. Purple Martin
19. Cat Bird
20. Wood Thrush
21. Blue-gray Gnatcatcher
22. White-eyed Vireo
23. Red-eyed Vireo
24. Prothonotary Warbler
25. Prairie Warbler
26. Yellowthroat
27. Yellow-breasted Chat
38. Orchard Oriole
29. Baltimore Oriole
30. Summer Tanager
31. Blue Grosbeak
32. Indigo Bunting
33. Dickcissel
34. Grasshopper Sparrow
35. Lark Sparrow

II Birds found only in the Ozark Highland Major Land Resource Area

1. Black-billed Cuckoo
2. House Wren
3. Parula Warbler
4. Yellow Warbler
5. Ovenbird
6. Louisiana Waterthrush
7. American Redstart
8. Chipping Sparrow

III Birds found only in the Southern Mississippi Valley Alluvium MLRA and in the Southern Mississippi Valley Silty Uplands MLRA

1. Little Blue Heron
2. Cattle Egret
3. Common Egret
4. Snowy Egret
5. Black-crowned Night Heron
6. Glossy Ibis
7. Mississippi Kite
8. King Rail
9. Painted Bunting

1/ Common names taken from Peterson's A Field Guide to the Birds

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Appendix table II-14--Winter resident bird species inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Birds found throughout the basin

1. Canada Goose
2. Red-tailed Hawk
3. Marsh Hawk
4. Herring Gull
5. Yellow-bellied Sapsucker
6. Red-breasted Nuthatch
7. Brown Creeper
8. Western Meadowlark
9. Rusty Blackbird
10. Evening Grosbeak
11. Red Crossbill
12. Savannah Sparrow
13. Slate-colored Junco
14. White-crowned Sparrow
15. White-throated Sparrow
16. Fox Sparrow
17. Song Sparrow

II Birds found only in the Ozark Highland Major Land Resource Area

1. Pine Warbler

III Birds found only in the Southern Mississippi Valley Alluvium MLRA and in the Southern Mississippi Valley Silty Uplands MLRA

1. Black Duck
2. Ruddy Duck
3. Krider's Redtail
4. Ring-billed Gull
5. Short-eared Owl
6. Winter Wren
7. American Goldfinch
8. Swamp Sparrow
9. Smith's Longspur
10. Snow Bunting

1/ Common names taken from Peterson's A Field Guide to the Birds

Appendix table II-15--Transient visitant bird species observed in the St. Francis River Basin (a minimum checklist) 1/

I Birds found throughout the basin

1. Common Loon
2. Pied-billed Grebe
3. Double-crested Cormorant
4. Great Blue Heron
5. American Bittern
6. White-fronted Goose
7. Snow Goose
8. Blue Goose
9. Mallard
10. Gadwall
11. Pintail
12. Green-winged Teal
13. Blue-winged Teal
14. American Widgeon
15. Shoveler
16. Redhead
17. Ring-necked Duck
18. Canvasback
19. Greater Scaup
20. Lesser Scaup
21. Bufflehead
22. Hooded Merganser
23. Common Merganser
24. Red-breasted Merganser
25. Broad-winged Hawk
26. Golden Eagle
27. Osprey
28. Virginia Rail
29. Sora Rail
30. American Coot
31. Semipalmated Plover
32. Common Snipe
33. Upland Plover
34. Spotted Sandpiper
35. Solitary Sandpiper
36. Greater Yellowlegs
37. Lesser Yellowlegs
38. Pectoral Sandpiper
39. White-rumped Sandpiper
40. Least Sandpiper
41. Short-billed Dowitcher
42. Long-billed Dowitcher
43. Franklin's Gull
44. Bonaparte's Gull
45. Forster's Tern
46. Least Tern
47. Caspian Tern
48. Black Tern
49. Least Flycatcher
50. Tree Swallow
51. Hermit Thrush
52. Swainson's Thrush
53. Gray-cheeked Thrush
54. Veery
55. Golden-crowned Kinglet
56. Ruby-crowned Kinglet
57. Water Pipit
58. Cedar Waxwing
59. Yellow-throated Vireo
60. Solitary Vireo
61. Warbling Vireo
62. Black and White Warbler
63. Swainson's Warbler
64. Common Tern
65. Worn-eating Warbler
66. Golden-winged Warbler
67. Blue-winged Warbler
68. Tennessee Warbler
69. Nashville Warbler
70. Magnolia Warbler
71. Myrtle Warbler
72. Black-throated Green Warbler
73. Cerulean Warbler
74. Blackburnian Warbler
75. Yellow-throated Warbler
76. Chestnut-sided Warbler
77. Bay-breasted Warbler
78. Blackpoll Warbler
79. Palm Warbler
80. Northern Waterthrush
81. Mourning Warbler
82. Hooded Warbler
83. Wilson's Warbler
84. Canada Warbler
85. Bobolink
86. Western Meadowlark
87. Brewer's Blackbird
88. Scarlet Tanager
89. Rose-breasted Grosbeak
90. Purple Finch
91. Pine Siskin
92. Le Conte's Sparrow
93. Henslow's Sparrow
94. Vesper Sparrow
95. Lincoln's Sparrow

II Birds found only in the Ozark Highland Major Land Resource Area

1. Ruddy Duck
2. Black Duck

III Birds found only in the Southern Mississippi Valley Alluvium MLRA and the Southern Mississippi Valley Silty Uplands MLRA

1. Horned Grebe
2. Western Grebe
3. Eared Grebe
4. White Pelican
5. Bald Eagle
6. American Golden Plover
7. Willet
8. Stilt Sandpiper
9. Semipalmated Sandpiper
10. Sanderling
11. American Avocet
12. Black-billed Cuckoo
13. House Wren
14. Parula Warbler
15. Yellow Warbler
16. Cape May Warbler
17. Ovenbird
18. Louisiana Waterthrush
19. Kentucky Warbler
20. American Redstart
21. Sharp-tailed Sparrow
22. Chipping Sparrow
23. Lapland Longspur

1/ Common names taken from Peterson's A Field Guide to the Birds

Appendix table II-16--Mammal species
inhabiting the St. Francis River Basin (a minimum checklist) 1/

I Mammals found throughout the basin

1. Opossum
2. Short-Tailed Shrew
3. Least Shrew
4. Southeastern Shrew
5. Eastern Mole
6. Little Brown Bat
7. Keen's Myotis
8. Gray Myotis
9. Indiana Myotis
10. Small-footed Myotis
11. Silver-Haired Bat
12. Eastern Pipistrelle
13. Big Brown Bat
14. Red Bat
15. Hoary Bat
16. Evening Bat
17. Rafinesque's Big-Eared Bat
18. Swamp Rabbit
19. Eastern Cottontail
20. Eastern Chipmunk
21. Gray Squirrel
22. Fox Squirrel
23. Southern Flying Squirrel
24. Beaver
25. Marsh Rice Rat
26. Western Harvest Mouse
27. Fulvous Harvest Mouse
28. Deer Mouse
29. White-footed Mouse
30. Cotton Mouse
31. Golden Mouse
32. Cotton Rat
33. Eastern Wood Rat
34. Prairie Vole
35. Pine Vole
36. Muskrat
37. Southern Bog Lemming
38. Black Rat
39. Norway Rat
40. House Mouse
41. Coyote
42. Red Fox
43. Gray Fox
44. Raccoon
45. Long-Tailed Weasel
46. Mink
47. Spotted Skunk
48. Striped Skunk
49. River Otter
50. Bobcat
51. White-Tailed Deer

II Mammals found only in the Ozark Highland Major Land Resource Area

1. Townsend's Big-Eared Bat
2. Meadow Jumping Mouse
3. Brush Mouse
4. Black Bear
5. Eastern Spotted Skunk
6. Panther

III Mammals found only in the Southern Mississippi Valley MLRA and the Southern Mississippi Valley Silty Uplands MLRA

1. Southeastern Myotis
2. Nine-Banded Armadillo
3. Eastern Harvest Mouse
4. Plains Pocket Gopher

1/ Common names taken from Hall's and Kelson's The Mammals of North America, Vols. I and II

Appendix table II-17--Area of land and forest land
St. Francis River Basin, 1969

Land class	Upland site	Bottom-land site	Basin
	- - - - - - - - 1000 Acres - - - - - - - -		
Land area			5,402.2
Forest land			
Commercial	696.4	251.4	947.8
Non-commercial 1/	37.2	0.0	37.2
All forest	733.6	251.4	985.0

1/ Includes unproductive sites and productive reserve.

Appendix table II-18--Area of land and forest land, by states
St. Francis River Basin, 1969

Land class	Arkansas	Missouri	Basin
	- - - - - - - - 1000 Acres - - - - - - - -		
Land area	2,861.2	2,541.0	5,402.2
Forest land			
Commercial	333.2	614.6	947.8
Non-commercial 1/	.6	36.6	37.2
All forest	333.8	651.2	985.0
Commercial forest as a percent of land area	12	24	18

1/ Includes unproductive sites and productive reserve

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Appendix table II-19--Area of commercial forest land by physiographic sites and state St. Francis River Basin, 1969

Physiographic sites	Arkansas	Missouri	Basin
	- - - - - - 1000 acres - - - - - - -		
Bottomland site	202.3	49.1	251.4
Upland site	130.9	565.5	696.4
All sites	333.2	614.6	947.8

Appendix table II-20--Area of commercial forest land by ownership class St. Francis River Basin, 1969

Ownership class	Arkansas	Missouri	Basin
	- - - - - - 1000 acres - - - - - - -		
Public:			
National Forest	18.8	99.2	118.0
Other federal	13.0	17.0	30.0
State	34.6	16.4	51.0
Total public	66.4	132.6	199.0
Private:			
Forest industry	11.3	10.2	21.5
Farmer and miscellaneous	255.5	471.8	727.3
Total private	266.8	482.0	748.8
All ownership	333.2	614.6	947.8

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Appendix table II-21--Area of commercial forest land
by stand size classes and state
St. Francis River Basin, 1969

Stand size class	Missouri	Arkansas	Basin
	1000 acres		
Sawtimber	197.9	162.7	360.6
Poletimber	279.4	79.9	359.3
Sapling and seedling	115.9	90.6	206.5
Non-stocked	21.4	0.0	21.4
All classes	614.6	333.2	947.8

Appendix table II-22--Area of commercial forest land
by productivity class
St. Francis River Basin, 1969

Productivity class	Missouri	Arkansas	Basin
	1000 acres		
225 cubic feet or more	0	19.3	19.3
165 - 225 cubic feet	.8	14.7	15.5
120 - 165 cubic feet	3.7	37.2	40.9
85 - 120 cubic feet	39.4	95.5	134.9
50 - 85 cubic feet	159.6	128.0	287.6
20 - 50 cubic feet	411.1	38.5	449.6
All Classes	614.6	333.2	947.8

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APPENDIX TABLES - CHAPTER III

Economic Development

Appendix table III-1--Area of land and forest, St. Francis Economic Study Area, year 1969

Land class	Area		
	Arkansas	Missouri	Study area
	- - - - - - - - 1,000 acres - - - - - - - -		
Land area	4,747.3	4,872.1	9,619.4
Forest land:			
Commercial	656.5	1,712.7	2,369.2
Noncommercial 1/	0.8	68.0	68.8
All forest	657.3	1,780.7	2,438.0
Forest land as a percent of land area	14	37	25

1/ Includes unproductive sites and productive reserve.

Source: 1969 Arkansas Forest Survey and 1972 Missouri Forest Survey.

Appendix table III-2--Area of commercial forest land by physiographic site, St. Francis Economic Study Area, 1947, 1959, and 1969

Year	Forest land			Physiographic site					
				Bottom land			Upland		
	Arkansas	Missouri	Total	Arkansas	Missouri	Total	Arkansas	Missouri	Total
	1,000 acres								
1947	1,577.5	2,121.0	3,698.5	1,401.5	411.0	1,812.5	176.0	1,710.0	1,886.0
1959	1,248.2	1,926.4	3,174.6	1,090.2	284.7	1,374.9	158.0	1,641.7	1,799.7
1969	656.5	1,712.7	2,369.2	515.5	198.9	714.4	141.0	1,513.8	1,654.8

Source: 1969 Arkansas Forest Survey and 1972 Missouri Forest Survey.

Appendix table III-3--Area of commercial forest land by ownership class, St. Francis Economic Study Area, year 1969

Ownership class	Area		
	Arkansas	Missouri	Study area
	1,000 acres		
Public:			
National Forest	18.8	262.1	280.9
Other Federal	23.2	14.4	37.6
State	32.1	31.6	63.7
Total public	74.1	308.1	382.2
Private:			
Forest industry	46.2	42.7	88.9
Farmer and miscellaneous	536.2	1,361.9	1,898.1
Total private	582.4	1,404.6	1,987.0
All ownership	656.5	1,712.7	2,369.2

Source: 1969 Arkansas Forest Survey and 1972 Missouri Forest Survey.

Appendix table III-4--Area of commercial forest land by forest type, St. Francis Economic Study Area, year 1969

Forest type	Area		
	Arkansas	Missouri	Study area
	1,000 acres		
Oak-pine	4.1	117.5	121.6
Oak-hickory	136.9	1,411.7	1,548.6
Oak-gum-cypress	411.8	34.2	446.0
Elm-ash-cottonwood	103.7	89.1	192.8
Nonstocked	0.0	60.2	60.2
All types	656.5	1,712.7	2,369.2

Source: 1969 Arkansas Forest Survey and 1972 Missouri Forest Survey.

Appendix table III-5--Area of commercial forest land by stand-size class, St. Francis Economic Study Area, year 1969

Stand-size class	Area		
	Arkansas	Missouri	Study area
	1,000 acres		
Sawtimber	320.6	551.4	872.0
Poletimber	157.5	778.6	936.1
Saplings and seedlings	178.4	322.5	500.9
Nonstocked	0.0	60.2	60.2
All class	656.5	1,712.5	2,369.2

Source: 1969 Arkansas Forest Survey and 1972 Missouri Forest Survey.

APPENDIX TABLES - CHAPTER IV

Problems and Needs of Water and Related Land Resources

Subsurface - Seepage Problems

Ground water and excess surface water have been problems in the basin since it was first used for the production of agricultural crops. Measures were taken to relieve problems of excess surface water and flooding in the early development of the area by constructing elaborate ditch systems. These ditch systems indirectly relieved many of the ground water problems.

Many complaints have been made by land owners and operators of continuing problems of the movement of water below the ground surface. The complaint most frequently made was that high stages in floodways would cause crop damage because of seepage of water under the levees. The high stages in the floodways were higher than natural conditions because the levees restricted the cross-sectional area above the bank-full flow. In some locations, high ground water was attributed to high stages of the Mississippi River.

The complaints resulted in a study by the Soil Conservation Service for the Corps of Engineers to determine the extent, magnitude, and effect of seepage water along the St. Francis floodway. Also, the data would be used to evaluate various alternative methods of reducing the problems. Five pilot areas with differing environmental conditions were selected for the study.

The Rivervale area was north of the confluence of the St. Francis River and Right Hand Chute of Little River. This area had a history of seepage, different kinds of surface soil, and a cropping pattern of soybeans and cotton, and levees on three sides.

The Cardwell area has a relatively thin surface stratum of clay or silt with a small area of exposed sand. The Kennett area was selected to determine the effects of a rapidly permeable soil on the rate of seepage and the effect of a ditch traversing the area on ground water elevations. The Tulot area included a deep ditch which extends through the fine grained surface deposits to the underlying sand. The ditch was serving as an interceptor of seepage water coming under the levee from the St. Francis floodway. The Piggott area has high-silt soils with the levee surrounding two sides of the area.

For a more detailed description and results from this 18-month study refer to St. Francis River Basin Below Wappapello Lake, Missouri and Arkansas, Preliminary Phase Report, (Ground Water Investigation), Department of the Army, Memphis District, Corps of Engineers, Memphis, Tennessee, October 1971.

In the Rivervale area, the piezometric surface generally sloped from the north central part of the area toward the southwest, south, and southeast to about the Poinsett County line. South of the county line, the slope was toward Ditch No. 56 and Ditch No. 4. These slopes are shown on figures 1 and 2 for the peak on April 27, 1970 and the low on August 3, 1970. The piezometric surface fluctuated four to five feet between the peak and the low. The piezometric surface on April 27th was two feet deep in most of the area, one foot deep in areas near the

levee, and less than half a foot deep in a few places but was from two to seven feet deep in August.

The water tables, as measured by shallow piezometers in the root zone, did not correlate with the piezometric surface measured in the deeper aquifer. The piezometric surface in the sand (20 feet deep) varied with the stages in the floodway while the water table showed very little change.

Crop responses to the water table indicated that two thirds of the crops benefited from the water table. Planting was delayed in one-tenth of the area because of surface water ponding. No damages to crops could be definitely attributed to shallow water table because of seepage from the floodways.

In the Cardwell area, the water sloped toward Red Devil Ditch. The water table benefited crops on 30 percent of the area. About 10 percent of the area received crop damage from ponded surface water but no damage could be attributed to shallow water tables.

In the Kennett area the water table sloped toward Ditch No. 3. About 30 percent of the area benefited from the water table and 30 percent was damaged by ponded surface water.

The Tulot Ditch appeared to be effective in providing relief of excess ground water. The piezometric surface and water table sloped toward the ditch during both high and low stages in the floodway. Crops benefited by the water table on 30 percent of the area. Surface water was ponded on 30 percent of the area but no damages were observed. A non-detrimental perched water table existed under 10 percent of the area.

In the Piggott area, the piezometric surface was nearly level at any given time; however, it fluctuated about 10 feet between high and low stages in the floodway. Water tables and water levels in drainage ditches did not correlate well with the piezometric surface. Planting was delayed on 40 percent of the area because of either excess rainfall or ponded surface water; however, no damages were caused by shallow water table.

The procedures used in making the observations and collecting the data were highly refined and have a high degree of reliability; however, the time period was only 18 months and included only one growing season. Therefore, the conclusions from this study of seepage problems along the St. Francis do not imply that in years of higher rainfall or higher stages in the floodway that real and significant seepage problems would not occur. Part of the seepage problems occur on slopes where fine textured material is overlain with sand. The sand has high rainfall intake rates and low water-holding capacity, which causes a saturated condition at the clay-sand interface and subsequent seepage. The flow directions of ground water shown in figures 1 and 2 are indicative of this condition which is fairly common in the area and independent of floodway stages.

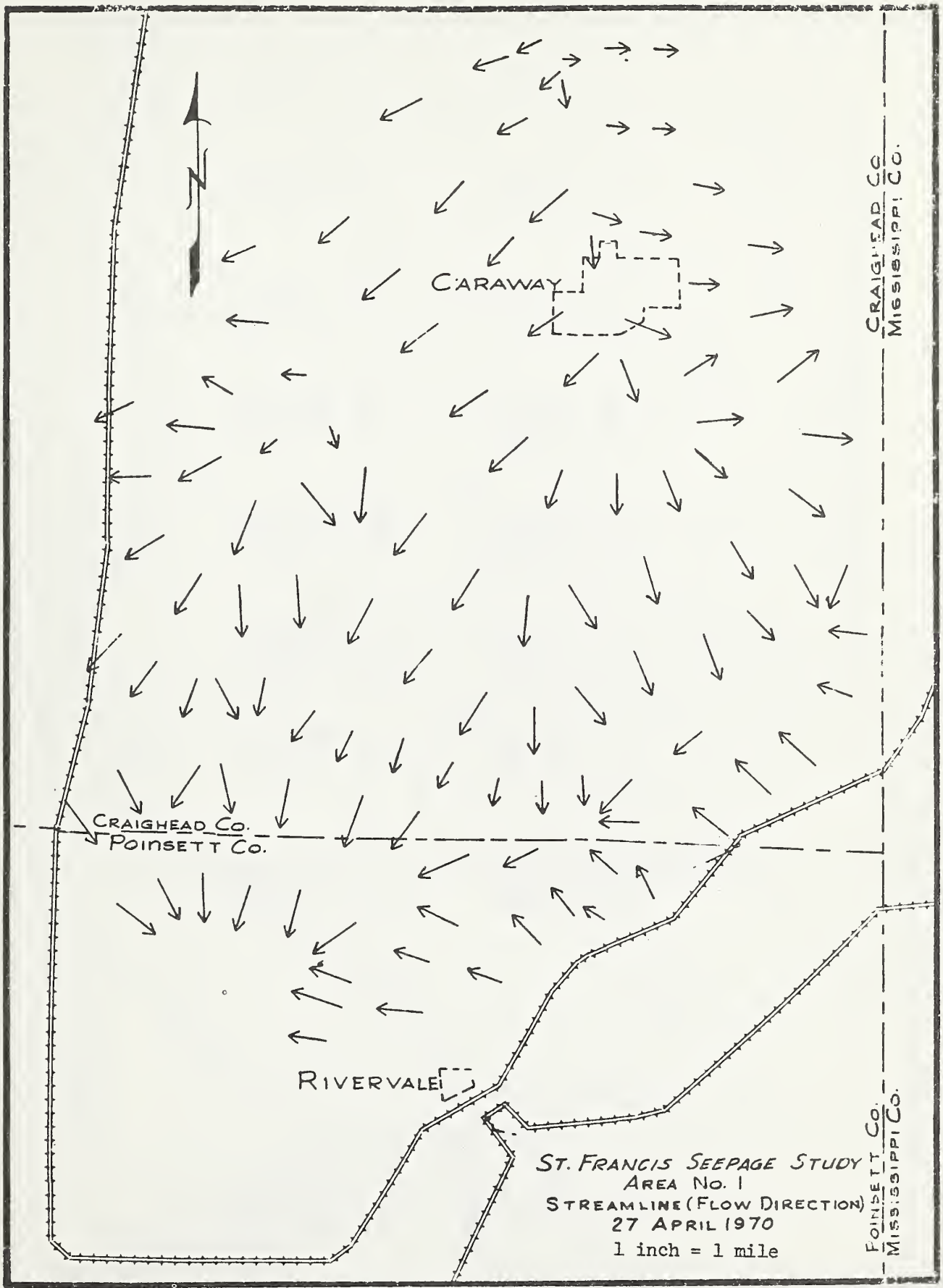

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FIGURE 1

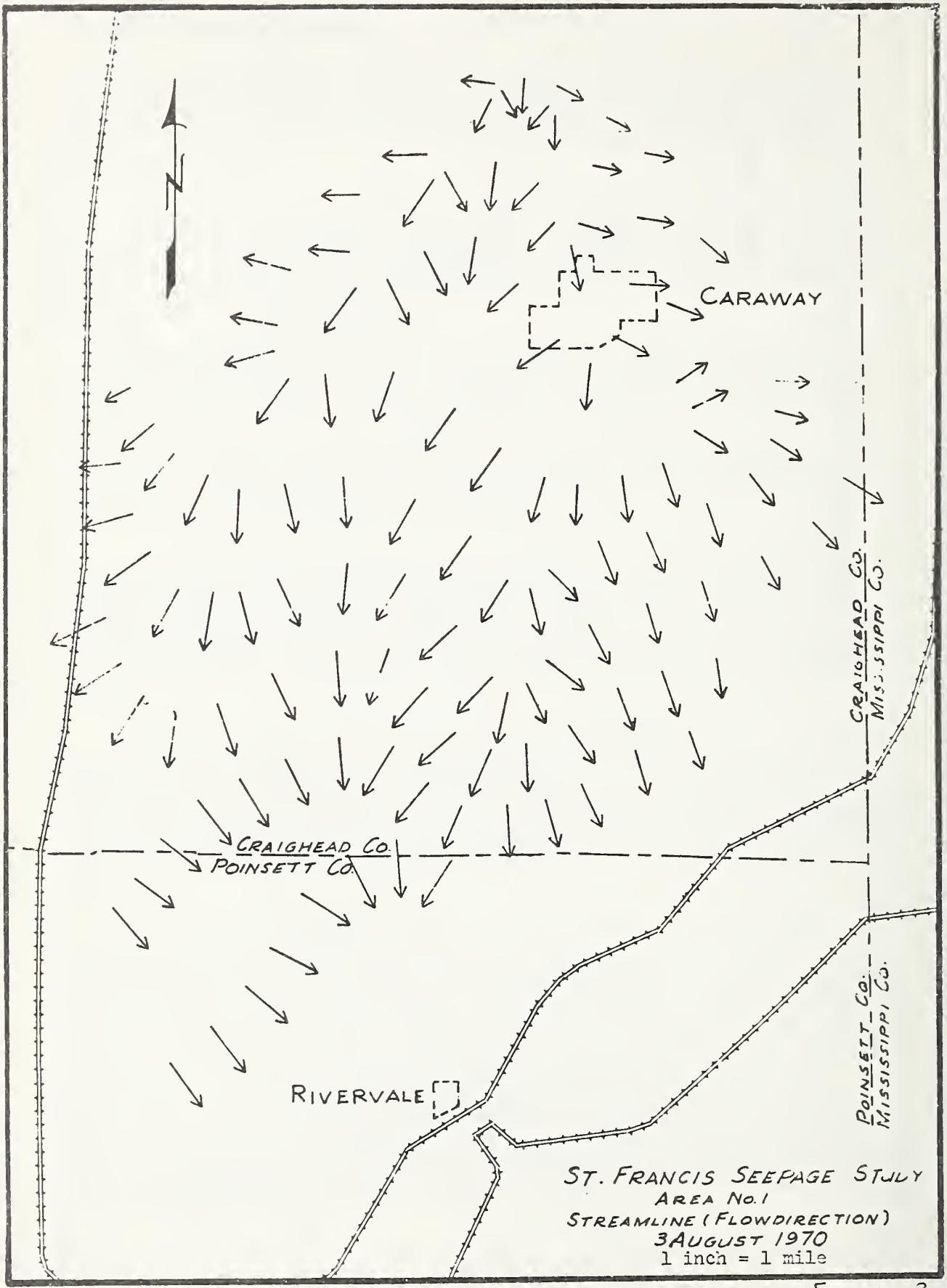

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FIGURE 2

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Appendix table IV-1--Crop distribution on irrigated land
St. Francis River Basin

Crop	1969	1970	1980		2000		2020	
	All	Wet Soils Only	All	Wet Soils Only	All	Wet Soils Only	All	Wet Soils Only
	Acres							
Missouri								
Corn	50,088	45,572	52,592	47,424	55,222	49,579	58,598	52,987
Soybeans	33,202	32,811	39,042	38,532	45,850	44,190	47,226	46,222
Cotton	10,133	9,114	10,133	8,892	10,133	9,700	10,133	9,019
Vegetables	3,123	0	3,279	0	3,607	0	3,968	0
Rice	4,641	3,646	4,641	3,952	4,966	4,311	5,363	4,510
Total	101,187	91,143	109,687	98,800	119,778	107,780	125,288	112,738
Arkansas								
Corn	264	0	0	0	0	0	0	0
Soybeans	96,827	86,435	119,267	106,058	135,824	120,689	149,004	122,811
Cotton	27,328	23,361	27,328	23,361	27,328	23,361	27,328	23,361
Vegetables	0	0	0	0	0	0	0	0
Rice	139,581	123,813	139,581	123,813	149,352	132,480	150,547	143,078
Total	264,000	233,609	286,176	253,232	312,504	276,530	326,879	289,250

Appendix table IV-2--Estimated principal use of water by source and counties - 1970
St. Francis River Basin, million gallons per day

County	Public supply			Self supplied industry			Rural use				Irrigation		
							Domestic	Livestock			Rice		
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Ground water	Surface water	Total	Ground water	Surface water	Total
Clay	.48	0	.48	0	0	0	.19	.06	.06	.12	4.77	0	4.77
Craighead	3.72	0	3.72	.72	.16	.88	1.05	.11	.07	.18	12.63	0	12.63
Crittenden	3.54	0	3.54	.05	0	.05	1.02	.08	.02	.10	27.98	0	27.98
Cross	1.04	0	1.04	1.22	.17	1.39	.70	.14	.03	.17	85.99	1.16	87.15
Greene	1.84	0	1.84	.15	0	.15	.60	.13	.09	.22	6.80	0	6.80
Lee	.58	0	.58	0	0	0	.44	.07	.05	.12	9.88	.29	10.17
Mississippi	4.83	0	4.83	6.96	0	6.96	1.13	.10	.03	.13	3.99	2.01	6.00
Phillips	0	0	0	0	0	0	.01	0	.01	.01	0	0	0
Poinsett	1.74	0	1.74	.29	0	.29	.80	.06	.04	.10	78.44	0	78.44
St. Francis	1.82	0	1.82	.30	0	.30	.99	.16	.04	.20	41.18	3.19	44.37
Woodruff	.03	0	.03	.01	0	.01	.02	.01	.01	.02	2.00	.10	2.10
County totals - Arkansas	19.62	0	19.62	9.70	.33	10.03	6.95	.92	.45	1.37	273.66	6.75	280.41

Appendix table IV-2 (cont.)--Estimated principal use of water by source and counties - 1970
St. Francis River Basin, million gallons per day

County	Irrigation (continued)			Fish and minnow farms			Recreation and Wildlife impoundments			Fuel-electric power			County total		
	Other crops														
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total
Clay	.55	0	.55	0	0	0	0	0	0	0	0	0	6.05	.06	6.11
Craighead	15.87	0	15.87	.23	.10	.33	0	0	0	0	0	0	34.33	.33	34.66
Crittenden	5.05	0	5.05	.98	.76	1.74	0	0	0	0	0	0	38.70	.78	39.48
Cross	6.63	.77	7.40	2.46	1.34	3.80	0	0	0	0	0	0	98.18	3.47	101.65
Greene	0	.01	.01	.32	.04	.36	0	0	0	0	0	0	9.84	.14	9.98
Lee	2.43	0	2.43	.04	.24	.28	0	0	0	0	0	0	13.44	.58	14.02
Mississippi	.39	.02	.41	1.19	0	1.19	.01	32.14	32.15	0	0	0	18.60	34.20	52.80
Phillips	0	0	0	0	0	0	0	2.93	2.93	.72	345.20	345.92 1/	.73	348.14	348.87
Poinsett	22.16	0	22.16	.80	.93	1.73	0	.14	.14	0	0	0	104.29	1.11	105.40
St. Francis	8.88	.81	9.69	2.26	1.30	3.56	0	0	0	.38	.90	1.28	55.97	6.24	62.21
Woodruff	.08	0	.08	.30	.17	.47	0	0	0	0	0	0	2.45	.28	2.73
County totals - Arkansas	62.04	1.61	63.65	8.58	4.88	13.46	.01	35.21	35.22	1.10	346.10	347.20	382.58	395.33	777.91

1/ Withdrawal is from the Mississippi River outside the basin boundary.

Appendix table IV-2 (cont.)--Estimated principal use of water by source and counties - 1970
St. Francis River Basin, million gallons per day

County	Public supply			Self supplied industry			Rural use				Irrigation		
							Domestic	Livestock			Rice		
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Ground water	Surface water	Total	Ground water	Surface water	Total
Bollinger	.01	0	.01	0	0	0	.04	.01	.03	.04	0	0	0
Butler	0	0	0	0	0	0	.01	0	.01	.01	0	0	0
Cape Girardeau	.03	0	.03	0	0	0	.08	0	.01	.01	0	0	0
Dunklin	1.78	0	1.78	.06	0	.06	.56	.03	.07	.10	0	0	0
Iron	.29	0	.29	10.90	0	10.90	.16	.01	.05	.06	0	0	0
Madison	.29	0	.29	0	0	0	.10	.02	.11	.13	0	0	0
New Madrid	.94	0	.94	0	0	0	.34	.02	.06	.08	.25	.03	.28
Pemiscot	1.97	0	1.97	0	0	0	.40	.01	.03	.04	3.00	.33	3.33
St. Francois	1.22	0	1.22	23.50	0	23.50	.24	.02	.10	.12	0	0	0
Ste. Genevieve	.03	0	.03	0	0	0	.02	0	.02	.02	0	0	0
Scott	1.00	0	1.00	0	0	0	.19	.04	.10	.14	.60	.07	.67
Stoddard	1.23	0	1.23	.37	0	.37	.66	.11	.32	.43	4.54	.50	5.04
Wayne	.23	0	.23	0	0	0	.17	.01	.10	.11	0	0	0
County totals - Missouri	9.02	0	9.02	34.83	0	34.83	2.97	.28	1.01	1.29	8.39	.93	9.32
Basin totals - mgd	28.64	0	28.64	44.53	.33	44.86	9.92	1.20	1.46	2.66	282.05	7.68	289.73
Basin totals - Ac.Ft./Yr.	32,077	0	32,077	49,873	370	50,243	11,110	1,344	1,635	2,979	315,896	8,602	324,498

Appendix table IV-2 (cont.)--Estimated principal use of water by source and counties - 1970
St. Francis River Basin, million gallons per day

County	Irrigation (continued)			Fish and minnow farms			Recreation and Wildlife impoundments			Fuel-electric power			County total		
	Other crops														
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total
Bollinger	.02	0	.02	.08	.04	.12	0	1.42	1.42	0	0	0	.16	1.49	1.65
Butler	0	0	0	.58	.29	.87	0	.01	.01	0	0	0	.59	.31	.90
Cape Girardeau	0	0	0	.08	.04	.12	0	2.98	2.98	0	0	0	.19	3.03	3.22
Dunklin	6.08	.67	6.75	.08	.04	.12	.02	2.46	2.48	0	7.02	7.02	8.61	10.26	18.87
Iron	0	0	0	0	0	0	0	1.22	1.22	0	0	0	11.36	1.27	12.63
Madison	0	0	0	0	0	0	0	1.39	1.39	0	0	0	.41	1.50	1.91
New Madrid	8.45	.94	9.39	0	0	0	0	0	0	0	0	0	10.00	1.03	11.03
Pemiscot	1.34	.15	1.49	.08	.04	.12	0	.55	.55	0	0	0	6.80	1.10	7.90
St. Francois	0	0	0	0	0	0	0	2.68	2.68	0	0	0	24.98	2.78	27.76
Ste. Genevieve	0	0	0	0	0	0	0	.38	.38	0	0	0	.05	.40	.45
Scott	4.60	.50	5.10	0	0	0	0	.28	.28	0	0	0	6.43	.95	7.38
Stoddard	14.54	1.62	16.16	.58	.29	.87	.02	2.09	2.11	0	0	0	22.05	4.82	26.87
Wayne	0	0	0	.08	.04	.12	0	148.56	148.56	0	0	0	.49	148.70	149.19
County totals - Missouri	35.03	3.88	38.91	1.56	.78	2.34	.04	164.02	164.06	0	7.02	7.02	92.12	177.64	269.76
Basin totals - mgd	97.07	5.49	102.56	10.14	5.66	15.80	.05	199.23	199.28	1.10	353.12	354.22	474.70	572.97	1,047.67
Basin totals - Ac.Ft./Yr.	108,718	6,149	114,867	11,357	6,339	17,696	56	223,138	223,194	1,232	395,494	396,726	531,664	641,726	1,173,390

Appendix table IV-3--Estimated water needs by time periods, principal use and source, St. Francis River Basin, million gallons per day 1/

Year	Public supply			Self supplied industry			Rural use				Irrigation		
							Domestic	Livestock			Rice 2/		
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Ground water	Surface water	Total	Ground water	Surface water	Total
1970 3/	28.64		28.64	44.53	.33	44.86	9.92	1.20	1.46	2.66	282.05	7.68	289.73
1980	32.94		32.94	55.66	.41	56.07	9.92	1.24	1.50	2.74	282.05	7.68	289.73
2000	41.18		41.18	66.79	.49	67.28	9.92	1.28	1.55	2.83	301.78	8.24	310.02
2020	48.18		48.18	80.15	.59	80.74	9.92	1.32	1.60	2.92	304.85	8.36	313.21

Appendix table IV-3 (cont.)--Estimated water needs by time periods, principal use and source, St. Francis River Basin, million gallons per day 1/

Year	Irrigation (continued) Other crops			Fish and minnow farms			Recreation and Wildlife impoundments			Fuel-electric power			Basin totals		
	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total	Ground water	Surface water	Total
1970 3/	97.07	5.49	102.56	10.14	5.66	15.80	.05	199.23	199.28	1.10	353.12	354.22	474.70	572.97	1,047.67
1980	110.98	6.17	117.15	15.62	8.71	24.33	.06	231.34	231.40	1.41	1,201.25	4/1,202.66	509.88	1,457.06	1,966.94
2000	122.47	6.78	129.25	21.50	12.00	33.50	.06	229.02	229.08	3.52	2,997.11	3,000.63	568.50	3,255.19	3,823.69
2020	130.26	7.14	137.40	33.56	18.74	52.30	.06	240.59	240.65	4.36	3,716.42	3,720.78	612.66	3,993.44	4,606.10

1/ To convert million gallons per day to acre-feet per year, multiply tabular values by 1,120 for individual years.
2/ Future needs based on "with development" acres.
3/ 1970 water use based on U.S.G.S. and other available data.
4/ The 1,200 megawatt installations planned at New Madrid, Mo. by 1980 represent 63 percent of the amount. The 63 percent amount will be withdrawn from the Mississippi River, adjacent to but outside the St. Francis River Basin.

Appendix table IV-4--Public water supplies, cities and towns with population over 100 (Arkansas), St. Francis River Basin

Counties and cities	Population	Ownership	Source
Clay County			
Patterson	417	Municipal	McCrory Supply
Piggott	3,089	Municipal	Wells
Rector	1,990	Municipal	Wells
St. Francis	297	Municipal	Wells
Greenway	240	Municipal	Wells
Craighead County			
Bay	751	Municipal	Wells
Black Oaks	272	Municipal	Wells
Brookland	465	Municipal	Wells
Caraway	952	Municipal	Wells
Farville	350	Association	Wells
Jonesboro	27,050	Municipal	Wells
Lake City	948	Municipal	Wells
Lake View	200	Association	Wells
Monette	1,076	Municipal	Wells
Crittenden County			
Crawfordsville	831	Municipal	Wells
Earle	3,146	Municipal	Wells
Gilmore	461	Municipal	Wells
Heafer-Black Oak	300	Ass. Tryonza Supply	Wells
Marion	1,634	Municipal	Wells
Turrell	783	Municipal	Wells
West Memphis	25,892	Municipal	Wells
Cross County			
Cherry Valley	556	Municipal	Well
Hickory Ridge	410	Municipal	Well
Parkin	1,731	Municipal	Wells
Wynne	6,696	Municipal	Wells
Greene County			
Center Hill	1,201	Municipal	Paragould Supply
Marmaduke	821	Municipal	Wells
Paragould	10,639	Municipal	Wells
Lee County			
Marianna	6,196	Municipal	Wells
Mississippi County			
Armorel	150	Private	Well
Bassett	265	Municipal	Well
Blytheville	24,752	Blytheville Water Company	Wells
Burdett	173	Association	Wells
Dell	358	Municipal	Well
Dogwood	300	Association	Well
Dyess	433	Association	Well
Gosnell	1,386	Association	Well
Grider-Driver	350	Association	Osceola Supply
Joiner	839	Municipal	Wells
Keiser	688	Municipal	Well
Leachville	1,582	Municipal	Wells
Little River	400	Association	Well
Luxora	1,566	Municipal	Well
Manila	1,961	Municipal	Wells
Osceola	7,204	Municipal	Wells
West Ridge	160	Association	
Wilson	1,009	Association	Wells
Yarbro	300	Association	Well

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Appendix table IV-4 (cont.)--Public water supplies, cities and towns with population over 100 (Arkansas), St. Francis River Basin

Counties and cities	Population	Ownership	Source
Phillips County			
Helena	10,415	Municipal	Wells
St. Francis County			
Caldwell	292	Municipal	Forrest City Supply
Forrest City	12,521	Municipal	Wells
Hughes	1,872	Municipal	Wells
Madison	984	Municipal	Forrest City Supply
Widener	292	Municipal	Forrest City Supply
Poinsett County			
Black Oak	272	Municipal	Wells
Fisher	361	Municipal	Well
Harrisburg	1,931	Municipal	Wells
Lepanto	1,846	Municipal	Wells
Marked Tree	3,208	Municipal	Wells
Payneway	190	Association	Well
Trumann	5,938	Municipal	Wells
Tyronza	510	Municipal	Wells
Weiner	715	Municipal	Well

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Appendix table IV-4 (cont.)--Public water supplies, cities and towns with population over 100 (Missouri), St. Francis River Basin

Counties and cities	Population	Source
Stoddard County		
Advance City	903	Well
Bell City	424	Well
Bernie	1,641	Wells
Bloomfield	1,584	Wells
Dexter	6,024	Wells
Dudley	248	Well
Essex	1,040	Well
Grayridge	250	Well
Puxico	759	Wells
Dunklin County		
Arbyrd	575	Well
Campbell	1,979	Wells
Cardwell	886	Well
Clarkton	1,177	Wells
Holcomb	593	Well
Hornersville	693	Well
Kennett	9,852	Wells
Malden	5,374	Wells
Senath	1,484	Well
Scott County		
Benton	640	Wells
Chaffee	2,793	Wells
Kelso	401	Wells
Miner	640	Well
Morley	528	Well
Oran	1,226	Wells
Scott City	2,464	Wells
Sikeston	14,690	Wells
Vanduser	306	Wells
Iron County		
Annapolis	330	Well
Arcadia	627	Wells
Ironton	1,452	Surface Water
Pilot Knob	582	Surface Water
New Madrid County		
Gideon	1,112	Wells
Howardville	500	Well
Lilbourn	1,152	Wells
Marston	666	Well
Matthews	538	Well
Morehouse	1,332	Well
New Madrid	2,719	Wells
North Lilbourn	334	Well
Parma	1,051	Wells
Point Pleasant	115	Well
Portageville	3,113	Wells
Risco	412	Wells

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Appendix table IV-4 (cont.)--Public water supplies, cities and towns with population over 100 (Missouri), St. Francis River Basin

Counties and cities	Population	Source
Pemiscot County		
Braggadocio	400	Well
Bragg City	210	Well
Caruthersville	7,350	Well
Cooter	414	Well
Deering	138	Well
Hayti	3,841	Wells
Holland	329	Well
Pascula	180	Wells
Homestown	273	Well
Steele	2,107	Well
Wardell	275	Well
St. Francois County		
Bismarck	1,387	Wells
Farmington	6,590	Wells
Cape Girardeau County		
Delta	462	Well
Madison County		
Fredericktown	3,799	Surface Water
Wayne County		
Greenville	321	Well

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Appendix table IV-5--Availability of sewage treatment plants by counties in towns with population over 100 (Missouri), St. Francis River Basin

Location	Population	Sewage Treatment Available
Stoddard County		
Advance	903	Yes
Baker	(114)	No
Bell City	424	Yes
Bernie	1,641	Yes
Bloomfield	1,584	Yes
Brownwood	(250)	No
Dexter	6,024	Yes
Dudley	248	No
Essex	1,040	No
Grayridge	(250)	No
Puxico	759	Yes
Cape Girardeau County		
Delta	462	No
Randles	(169)	No
Iron County		
Annapolis	330	Yes
Arcadia	627	Yes
Des Arc	222	No
Glover	(400)	No
Graniteville	(400)	No
Ironton	1,452	Yes
Pilot Knob	582	No
Madison County		
Cobalt City Village	228	No
Fredericktown	3,799	Yes
Junction City	166	No
Mine La Motte	(120)	No
New Madrid County		
Catron	122	No
Gideon	1,112	Yes
Howardville	500	No
Lilbourn	1,152	Yes
Matthews	538	No
Marston	666	No
Morehouse	1,332	Yes
New Madrid	2,719	Yes
North Lilbourn	334	No
Parma	1,051	Yes
Point Pleasant	(115)	No
Portageville	3,117	Yes
Risco	412	No
Wayne County		
Greenville	328	No
Patterson	(145)	No

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Appendix table IV-5 (cont.)--Availability of sewage treatment plants by counties in towns with population over 100 (Missouri), St. Francis River Basin

Location	Population	Sewage Treatment Available
Pemiscot County		
Bragg City	(210)	No
Braggadocio	(400)	No
Carthesville	7,350	Yes
Cooter	414	No
Deering	(138)	No
Hayti	3,841	Yes
Holland	329	No
Homestown	(273)	No
Pascola	180	No
Steele	2,107	Yes
Wardell	(275)	No
St. Francois County		
Bismarck	1,387	Yes
Doe Run	(800)	No
Farmington	6,590	Yes
Iron Mountain	(300)	No
Knob Lick	(150)	No
Scott County		
Benton	640	Yes
Chaffee	2,793	Yes
Haywood City	(420)	No
Kelso	401	No
Morley	(528)	No
Minor	640	No
New Hamburg	(185)	No
Oran	1,226	Yes
Scott City	2,464	Yes
Sikeston	14,690	Yes
Vanduser	306	No
Dunklin County		
Arbyrd	575	No
Campbell	1,979	Yes
Clarkton	1,177	No
Cordwell	(859)	No
Holcomb	593	No
Hornerville	693	Yes
Kennett	9,852	Yes
Malden	5,374	Yes
Rives	(120)	No
Senath	1,484	Yes

Note: Populations in parenthesis were taken from 1970 Missouri road map - other came from 1970 census.

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Appendix table IV-6--Availability of sewage treatment plants by counties in towns with population over 100 (Arkansas), St. Francis River Basin

Location	Population	Sewage Treatment Available
Clay County		
Patterson	417	No
Piggott	3,087	Yes
Rector	1,990	Yes
St. Francis	297	No
Greenway	240	No
Craighead County		
Bay	751	Yes
Black Oaks	272	No
Brookland	465	No
Caraway	952	Yes
Farville	350	No
Jonesboro	27,050	Yes
Lake City	948	Yes
Lakeview	200	No
Monette	1,076	Yes
Crittenden County		
Crawfordsville	831	Yes
Earle	3,146	Yes
Gilmore	461	No
Heafer-Black Oak	300	No
Marion	1,634	Yes
Turrell	783	Yes
West Memphis	25,892	Yes
Cross County		
Cherry Valley	556	Yes
Hickory Ridge	410	Yes
Parkin	1,731	Yes
Wynne	6,696	Yes
Greene County		
Center Hill	1,201	No
Marmaduke	821	Yes
Paragould	10,639	Yes
Lee County		
Marianna	6,196	Yes
Mississippi County		
Armorel	150	No
Bassett	265	No
Blytheville	24,752	Yes
Burdett	173	No
Dell	358	No
Dogwood	300	No
Dyess	433	No
Gosnell	1,386	No
Grider-Driver	350	No
Yarbro	300	No
Joiner	839	Yes
Keiser	688	No
Leachville	1,582	Yes
Little River	400	No
Luxora	1,566	Yes
Manila	1,961	Yes
Osceola	7,204	Yes
West Ridge	160	No
Wilson	1,009	Yes

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Appendix table IV-6 (cont.)--Availability of sewage treatment plants by counties in towns with population over 100 (Arkansas), St. Francis River Basin

Location	Population	Sewage Treatment Available
Phillips County		
Helena	10,415	Yes
St. Francis County		
Caldwell	292	No
Forrest City	12,521	Yes
Hughes	1,872	Yes
Madison	984	Yes
Widener	292	No
Poinsett County		
Black Oak	272	No
Fisher	361	Yes
Harrisburg	1,931	Yes
Lepanto	1,846	Yes
Marked Tree	3,208	Yes
Payneway	190	No
Trumann	5,938	Yes
Tyronza	510	Yes
Weiner	715	Yes

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Pollution Survey Report
Arkansas Pollution Control Commission
St. Francis River Basin, 1965 to 1968
Summary and Conclusions

The results of this survey show the possible sources of water pollution in the St. Francis River Basin, their effects on the receiving streams and some background data which may be used for future pollution control activities. The data obtained, especially those from municipalities and industries without adequate waste treatment facilities, indicate the sources where abatement measures are needed to control effectively water pollution of surface streams.

At the time of the survey there were thirty known significant sources of domestic wastes from the cities and installations located within the St. Francis River Basin. Of these sources the following cities or places have secondary waste treatment facilities: Bay, Blytheville, Agrico Chemical Company, Blytheville Air Force Base, Caraway, Forrest City, Harrisburg, Jonesboro, Lake City, Lepanto, Manila, Marked Tree, Paragould, Piggott, Rector, Trumann, Tyronza, and Wynne. The cities with primary sewage treatment plants are Marianna, Marion, Monette and Parkin. The cities of Hughes, Leachville and Marmaduke have inadequate sewage treatment plants which were being bypassed while the cities of Helena, Luxora, Osceola, West Memphis and Wilson have no treatment facilities and are discharging untreated sewage directly into the receiving streams.

In addition there are twelve sources of industrial wastes which were investigated and sampled during this survey. Of these sources three discharge directly into the Mississippi River, two have waste treatment facilities under construction, one disposes most of its effluent into the city sewer while six have no waste treatment facilities. The industries surveyed were Agrico Chemical Company at Blytheville, Arkansas Grain Corporation at Helena, Blytheville Canning Company at Blytheville, Carroll Packing Plant at Paragould, Colson Company at Jonesboro, Crane Company at Jonesboro, Douglas Lomason Company at Marianna, L. A. Darling Company at Paragould, Nat Buring Packing Plant at Wilson, Paymaster Oil Company at Osceola, Poinsett Lumber Manufacturing Company at Trumann, and Randall Company at Blytheville.

Localized water pollution of drainage streams was found generally below large centers of population such as Paragould, Blytheville, Jonesboro, Harrisburg, Wynne, Forrest City and Marianna. The streams affected by discharges from municipal sewage treatment plants and industrial sources are Eight Mile Ditch, Pemiscot Bayou, Whiteman Ditch, Ten Mile Bayou, and Crow Creek. The effects, however, were limited in extent. Asher Ditch was not receiving any effluent from the Caraway oxidation pond but survey results indicated some degree of pollution as shown by dissolved oxygen of 2.7 ppm and coliform counts exceeding 5000 per 100 ml. This would be due to the presence of some solid wastes and scrap material on the bank of the stream. Streams with adequate flows for dilution, such as Big Slough Ditch, Right Hand Chute of Little River, Left Hand Chute of Little River, L'Anguille

River, and St. Francis River showed no significant changes in their water quality beyond the immediate vicinities of the outfalls of the sources of pollution.

Streams - All the discharges from the foregoing sources, both municipal and industrial, finally flow into the St. Francis River which receives the drainage of the entire basin. The biological analysis of water samples from this stream showed high coliform bacteria count in the vicinity of Parkin due to direct discharge of the effluent from the primary sewage treatment plant of this city. This count which was in excess of 5000 per 100 ml shows that the stream is adversely affected by this particular discharge and measures for its abatement are necessary. The chemical water quality tests also showed an increased level of nitrates and of turbidity caused apparently by the extensive agricultural areas draining into this stream. Due to some dilution flow coming from the different tributaries no other significant changes have been found in the water quality of this stream after it enters and before it leaves the State.

Big Slough Ditch receives surface runoffs and final discharges from the sewage treatment plants at Piggott, Rector and Marmaduke. This survey showed no significant adverse effects from these pollution sources and this stream has good water quality before it flows into St. Francis River.

Eight Mile Ditch carries the effluents from the sewage treatment plants and industries in Paragould as well as drainage from surrounding areas including Center Hill which had no adequate sewage disposal system. This stream showed some pollution effects due to these sources as indicated by a coliform bacteria count of more than 10,000 per 100 ml, and some concentrations of nickel, zinc, chromium and copper at a sampling station above its confluence with St. Francis River.

The Left Hand Chute of Little River receives the final waste discharges from municipal and industrial sources located in Blytheville and in Lepanto. Below the outfalls the stream showed heavy pollution effects. However, because of the large drainage area and dilution afforded by its tributaries the survey results show that the effects are mostly dissipated before this stream enters the St. Francis River.

The Right Hand Chute of Little River receives no discharges from any significant source of pollution. Except for some turbidity it has fair water quality.

Whiteman Ditch, Gum Slough Ditch, Little Bay Ditch and Big Bay Ditch which finally flow into drainage Ditch No. 10 and Ditch No. 104 receive the municipal and industrial waste discharges from Jonesboro, Bay and Trumann. Below these outfalls the receiving streams showed some adverse pollution effects. The main sources of pollution for these streams are the run-down Nettleton sewage treatment plant and the untreated wastes from Colson Company, Crane Company and Poinsett Wood Manufacturing Company.

L'Anguille River carries the final effluents and drainage from the cities of Harrisburg, Wynne, Forrest City and Marianna. The pollution effects from these sources were limited in extent to the immediate vicinity of the outfalls. This stream has fair water quality.

In the smaller streams the pollution effects are localized. Municipal wastes are causing varying degrees of oxygen depletion and increased coliform bacteria count below the outfalls, but this condition is not far-reaching in any case.

In general, the results of biologic examination of the waters in the receiving streams show the extent of pollution by sewage or industrial wastes. In most cases results indicate that there is some degree of self-purification of the streams. The comparisons of the different types of both plankton and benthos organisms reflect the biological water quality as affected by the different sources of pollution in the St. Francis River Basin. Some relatively high coliform bacteria counts were obtained below outfalls of primary sewage treatment plants or where treatment plants were being by-passed. Furthermore, untreated toxic industrial wastes, such as those from the metal plating plants in Blytheville, Paragould and Jonesboro changed the biological productivity of the streams in these areas.

Appendix table IV-7--Resources and/or facilities required to meet selected recreational needs in the St. Francis River Basin, Missouri portion, for 1970, and projected 1980 and 1990 1/

Activity	Resource and/or facility	Year		
		1970	1980	1990
Bike trails	Miles	530	520	530
Horse trails	Miles	7	6	4
Games	Acres	620	720	830
Fishing	Acres	7,900	7,900	7,900
Boating	Acres	3	2	2
Sailing	Acres	0	0	0
Swimming	Sq.ft.	8,900	5,300	4,800
Hunting	Acres	26,700	22,000	18,200
Camping	Acres	5	4	3
Hiking	Miles	82	79	76
Picnic	Acres	1	1	1
Winter sports	Acres	26	22	20

1/ Based on State of Missouri Outdoor Recreation Plan, Volume II, Part D, Minimum County Need and Minimum Additional Regional Need.

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Appendix table IV-8--Resources and/or facilities required to meet selected recreational needs in the St. Francis River Basin, Arkansas portion, for 1970, and projected 1980, 1990, and 2000 1/

Activity	Facility and/or resource	Year			
		1970	1980	1990	2000
Swimming	Pool (sq.ft.)	595,000	847,000	1,091,000	1,386,000
	Beach (sq.ft.)	2,237,000	3,225,000	4,153,000	5,268,000
Water sports	Acres	-	23	3,100	6,700
Boating	Docks	5,800	8,100	10,400	13,100
	Parking spaces	2,200	3,600	4,900	6,500
Horseback riding	Miles	570	780	950	1,200
Outdoor games	Acres	1,800	2,700	3,700	4,800
Golf	9-hole	6	13	17	23
	18-hole	2	3	5	7
Tennis	Courts	81	130	180	230
Picnic	Acres	1,100	1,600	2,100	2,600
Camping					
a. Tent	Acres	210	310	410	530
b. Trailer	Acres	440	610	770	960
Pleasure driving	Miles	690	1,000	1,300	1,700
Hunting					
a. Small game	Acres	7,655,000	10,496,000	13,203,000	16,472,000
b. Big game	Acres	4,149,000	5,680,000	7,136,000	8,895,000
c. Waterfowl	Acres	3,360,000	4,613,000	5,806,000	7,245,000
Warm water fishing	Acres	61,000	97,000	131,000	173,000

1/ Based on Arkansas Statewide Comprehensive Outdoor Recreation Plan, Statistical Summary, Regional Demand, Supply, and Comparisons, 1968.

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Appendix table IV-9--Total irrigation practices by counties in St. Francis River Basin
Applied through 1970 (Adjusted from annual 99 report) 1/

Item	Unit	Arkansas Counties										
		Mississippi	Craighead	Lee	Poinsett	Crittenden	St. Francis	Greene	Clay	Woodruff	Cross	Totals
Wells	No.	212	200	78	475	246	556	97	32	34	887	2,817
Irrig. stg. reservoirs	No.	8	10	3	25	56	31	3	97	10	76	319
Irrig. systems-sprinkler	No.	64	6	2	13	20	29	4	6	0	12	156
Irrig. systems-sur. & sub.	No.	207	200	68	500	264	715	59	37	50	900	3,000
Irrig. water mgt.	Ac.	7,441	16,000	11,900	65,000	40,000	39,140	4,080	1,500	4,400	60,200	249,661
Drainage land grading	Ac.	22,154	1,200	16	6,300	4,478	560	654	104	5	641	36,112
Irrig. land leveling	Ac.	28,951	7,000	181	11,000	6,424	2,265	2,211	3,240	100	6,467	67,839
Irrig. pipelines	Ft.	11,661	1,000	8,672	65,000	11,706	67,386	4,070	0	14,940	70,473	254,908
Irrig. field ditch	Ft.	92,228	300,000	168,500	600,000	806,060	1,990,000	109,000	80,105	125,800	1,360,200	5,631,893

Item	Unit	Missouri Counties							
		New Madrid	Stoddard	Scott	Dunklin	Pemiscot	Bollinger	Cape Girardeau	Totals
Wells	No.	617	959	312	600	126	128	0	2,742
Irrig. systems-sprinkler	No.	50	21	7	140	25	0	0	243
Irrig. systems-sur. & sub.	No.	360	689	149	260	75	0	0	1,533
Irrig. water mgt.	No.	25,172	28,175	3,254	31,000	2,644	0	0	90,245
Drainage land grading	Ac.	12,029	15,120	1,274	7,780	3,035	90	41	39,369
Irrig. land leveling	Ac.	33,889	31,047	10,766	4,000	11,718	217	34	91,671
Irrig. pipelines	Ft.	0	2,600	0	0	0	0	0	2,600
Irrig. field ditch	Ft.	67,230	221,230	0	0	3,550	0	0	292,010

1/ Contacted D.C.'s in counties and got their estimate on amount of practices in St. Francis River Basin.

Appendix table IV-10--Estimated irrigated water usage in the basin, 1970
St. Francis River Basin

County	Irrigation						
	Rice			Other Crops			
	Ground Water	Surface Water	Total	Ground Water	Surface Water	Total	Basin Total
	million gallons per day						
Arkansas							
Clay	4.77	0	4.77	.55	0	.55	5.32
Craighead	12.63	0	12.63	15.87	0	15.87	28.50
Crittenden	27.98	0	27.98	5.05	0	5.05	33.03
Cross	85.99	1.16	87.15	6.63	.77	7.40	94.55
Greene	6.80	0	6.80	0	.01	.01	6.81
Lee	9.88	.29	10.17	2.43	0	2.43	12.60
Mississippi	3.99	2.01	6.00	.39	.02	.41	6.41
Phillips	0	0	0	0	0	0	0
Poinsett	78.44	0	78.44	22.16	0	22.16	100.60
St. Francis	41.18	3.19	44.37	8.88	.81	9.69	54.06
Woodruff	2.00	.10	2.10	.08	0	.08	2.18
County Totals Arkansas	273.66	6.75	280.41	62.04	1.61	63.65	344.06
Missouri							
Bollinger	0	0	0	.02	0	.02	.02
Butler	0	0	0	0	0	0	.00
Cape Girardeau	0	0	0	0	0	0	.00
Dunkin	0	0	0	6.08	.67	6.75	6.75
Iron	0	0	0	0	0	0	.00
Madison	0	0	0	0	0	0	.00
New Madrid	.25	.03	.28	8.45	.94	9.39	9.67
Pemiscot	3.00	.33	3.33	1.34	.15	1.49	4.82
St. Francois	0	0	0	0	0	0	.00
Ste. Genevieve	0	0	0	0	0	0	.00
Scott	.60	.07	.67	4.60	.50	5.10	5.77
Stoddard	4.54	.50	5.04	14.54	1.62	16.16	21.20
Wayne	0	0	0	0	0	0	.00
County Totals Missouri	8.39	.93	9.32	35.03	3.88	38.91	48.23
Basin Totals	282.05	7.68	289.73	97.07	5.49	102.56	392.29
Basin Totals Ac.Ft./Yr.	315,896	8,602	324,498	108,718	6,149	114,867	439,365

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Appendix table IV-11--Present and future land treatments under alternative plans
St. Francis River Basin

Items	Unit	Present	Remaining to be done	Going program	Accel. with economic emphasis	Accel. with environmental emphasis	Accel. with formulated plan
1. Conservation cropping system	Acres	2,285,097	812,400	609,300	771,780	771,780	771,780
2. Contour farming	Acres	22,444	19,215	5,764	18,254	19,215	18,254
3. Crop residue mgt.	Acres	2,470,013	709,808	567,846	709,808	709,808	709,808
4. Drainage field ditch	Miles	4,075	4,356	3,267	3,919	3,485	3,919
5. Drainage land grading	Acres	75,481	83,425	41,712	79,254	75,082	79,254
6. Drainage main or lateral	Miles	7,592	7,103	3,551	7,103	7,103	7,103
7. Irrigation land leveling	Acres	159,510	147,825	14,782	73,912	73,912	73,912
8. Irrigation stg. res.	Number	319	41	26	41	41	41
9. Irrigation sys. sprinkler	Number	399	151	32	151	32	151
10. Irrigation sys. surf. & sub.	Number	4,533	604	363	967	467	967
11. Irrigation water mgt.	Acres	339,906	160,094	27,192	160,094	60,094	160,094
12. Irrigation pipelines	Miles	49	101	4	101	101	101
13. Irrigation field ditch	Miles	1,122	1,878	90	1,878	1,878	1,878
14. Irrigation wells	Number	5,559	445	445	445	445	445
15. Structures for water control	Number	12,266	111,343	38,970	38,970	38,970	38,970
16. Farm ponds	Number	3,036	2,189	219	1,970	2,189	2,189
17. Brush and weed control	Acres	46,233	121,016	72,610	108,914	84,711	108,914
18. Pasture and hayland planting	Acres	124,583	81,500	20,375	81,500	81,500	81,500
19. Pasture and hayland mgt.	Acres	108,734	194,891	155,912	194,891	194,891	194,891
20. Critical area planting	Acres	1,338	10,499	40	10,499	10,499	10,499
21. Wildlife wetland habitat mgt.	Acres	52,323	18,713	18,713	18,713	18,713	18,713
22. Wildlife upland habitat mgt.	Acres	59,789	82,254	12,338	20,563	82,254	82,254
23. Tree planting - critical	Acres	-	-	-	6,000	6,000	6,000
- other	Acres	-	-	15,700	8,000	6,400	6,400
24. Forest improvement and protection	Acres	-	-	210,500	45,300	18,600	31,200

Appendix table IV-12--Forest management practices needed on forest land by subbasin, St. Francis River Basin

Practices	Subbasins			
	Above Wappapello	Below Wappapello	Little River	L'Anguille
	Acres			
Forest management plans	361,800	206,800	39,600	87,800
Critical area stabilization				
Tree planting	-	10,900 1/	900 2/	1,400 3/
Logging roads and skid trails 4/	2,200	1,200	200	-
Grazing removals	23,000	45,900	9,900	-
Tree planting				
Open 5/	12,500	8,900	-	-
Conversion	15,100	9,000	-	-
Interplanting	-	6,100	-	-
Timber stand improvement				
Conversion release	15,100	9,000	-	-
Pine release	18,100	-	-	-
Hardwood release	55,300	107,400	18,500	21,500
Improvement cut	81,800	18,300	-	28,100

1/ Gullies 3,400 acres; gravel pits 1,500 acres; sheet erosion 6,000 acres.
2/ Gullies 600 acres; gravel pits 300 acres.
3/ Gullies 1,000 acres; gravel pits 400 acres.
4/ Annual figure.
5/ Commercial forest land less than 10 percent stocked with growing-stock trees.

APPENDIX TABLES - CHAPTER VI

Alternative Plans

Appendix table VI-1--Distribution of wet soils and other benefited flood plain by watershed
St. Francis River Basin, Arkansas and Missouri

CNI Watershed Number	Area	Corps 100 yr. flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils Needing Drainage 1/	Division of Soils: Corps	Division of Soils: SCS 4/	Other SCS benefited flood plain	Total SCS benefited area
	Acres								
5-1	223,360	0	0	100.00	0				
5-2	88,960	0	0	100.00	0				
5-3	173,440	0	0	100.00	0				
5-4	126,080	0	0	100.00	0				
5-5	195,840	0	0	100.00	0				
5-5a	30,720	0	0	100.00	0			1,535	1,535
5-7	216,960	84,548	38.97	61.03	96,300	37,528	58,772	4,073	62,845
5-8 2/	58,880	7,859	13.35	86.65	19,800	2,643	17,157		17,157
5-9	19,840	6,554	33.03	66.97	8,200	2,708	5,492	200	5,692
5-10 2/	70,144	29,786	42.46	57.54	16,940	7,193	9,747	0	9,747
5-11	69,120	22,271	32.22	67.78	41,096	13,241	27,855	0	27,855
5-11a	26,880	5,728	21.31	78.69	15,200	3,239	11,961	0	11,961
5-12	66,816	33,223	49.72	50.28	35,116	17,460	17,656	0	17,656
5-13	136,960	24,173	17.65	82.35	47,065	8,307	38,758	4,500	43,258
5-14	49,920	9,347	18.72	81.28	21,193	3,967	17,226	35	17,261
5-15	206,080	143,777	69.77	30.23	177,247	123,665	53,582	0	53,582
5-15a 2/	30,720	0	0	100.00	21,500	0	21,500	0	21,500
5-15b	44,800	40,097	89.50	10.50	44,800	40,096	4,704	0	4,704
5-16	58,880	40,326	68.49	31.51	46,508	31,853	14,655	0	14,655
5-17 2/	18,688	17,757	95.02	4.98	16,088	15,287	801	0	801
5-19	238,592	138,622	58.10	41.90	186,679	108,460	78,219	0	78,219
5-20	80,640	53,730	66.63	33.37	80,570	53,684	26,886	0	26,886
5-21	195,008	137,547	70.53	29.47	68,797	48,523	20,274	0	20,274
5-22 2/	51,392	2,979	5.80	94.20	11,817	685	11,132	0	11,132

Appendix table VI-1 (cont.)--Distribution of wet soils and other benefited flood plain by watershed
St. Francis River Basin, Arkansas and Missouri

CNI Watershed Number	Area	Corps 100 yr. flood	Percent of Watershed		Wet Soils Needing Drainage 1/	Division of Soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS 4/		
	Acres								
5-23	119,040	49,285	41.40	58.60	39,338	16,286	23,052	0	23,052
5-24	87,040	77,903	89.50	10.50	64,097	57,367	6,730	0	6,730
5-25	104,320	83,746	80.28	19.72	64,646	51,898	12,748	0	12,748
5-26	62,720	51,209	81.65	18.35	48,127	39,296	8,831	0	8,831
5-27	62,720	0	0	100.00	41,030	0	41,030	0	41,030
5-28	90,880	81,111	89.25	10.75	59,219	52,853	6,366	0	6,366
5-29	51,840	22,340	43.09	56.91	12,725	5,483	7,242	0	7,242
5-30	66,560	59,573	89.50	10.50	36,518	32,684	3,834	0	3,834
5-31	75,520	56,136	74.33	25.67	50,861	37,805	13,056	0	13,056
5-32	49,280	43,534	88.34	11.66	32,402	28,624	3,778	0	3,778
5-33	66,176	51,392	77.66	22.34	34,399	26,714	7,685	0	7,685
5-33a 2/	36,224	20,851	57.56	42.44	23,307	13,416	9,891	0	9,891
5-34	94,080	83,631	88.89	11.11	48,365	42,992	5,373	0	5,373
5-35	27,520	13,037	47.37	52.63	9,849	4,665	5,184	0	5,184
5-35a	16,000	1,053	6.58	93.42	5,106	336	4,770	0	4,770
5a-1	150,400	59,229	39.38	60.62	105,800	41,664	64,136	2,562	66,698
5a-3 2/	9,600	343	3.57	96.43	2,570	92	2,478	0	2,478
5a-5	118,400	0	0	100.00	33,828	0	33,828	6,142	39,970
5a-6	85,760	72,175	84.16	15.84	59,300	49,907	9,393	60	9,453
5a-7	195,200	120,864	61.92	38.08	131,300	81,301	49,999	120	50,119
5a-8	186,880	154,374	82.61	17.39	104,200	86,080	18,120	200	18,320
5a-9	130,560	79,049	60.55	39.45	47,800	28,943	18,857	0	18,857
5a-10	197,120	103,108	52.31	47.69	112,340	58,765	53,575	0	53,575
5a-11	131,200	62,506	47.64	52.36	117,900	56,168	61,732	0	61,732
5a-11a 3/	24,960	22,340	89.50	10.50	23,050	20,630	2,420	0	2,420
5a-12	83,200	74,467	89.50	10.50	59,887	53,599	6,288	0	6,288

Appendix table VI-1 (cont.)--Distribution of wet soils and other benefited flood plain by watershed
St. Francis River Basin, Arkansas and Missouri

CNI Watershed Number	Area	Corps 100 yr. flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils Needing Drainage 1/	Division of Soils: Corps	Division of Soils: SCS 4/	Other SCS benefited flood plain	Total SCS benefited area
	Acres								
5b-1	23,680	13,275	56.06	43.94	16,567	9,287	7,280	0	7,280
5b-2 2/	35,840	8,137	22.70	77.30	23,591	5,355	18,236	0	18,236
5b-3	44,160	10,418	23.59	76.41	27,261	6,431	20,830	0	20,830
5b-4	31,360	2,876	9,17	90.83	27,251	2,499	24,752	0	24,752
5b-5	56,320	8,732	15.50	84.50	35,504	5,503	30,001	1,756	31,757
5b-6	42,240	3,514	8.32	91.68	41,700	3,469	38,231	0	38,231
5b-7	59,960	1,827	3.21	96.79	46,471	1,492	44,979	0	44,979
5b-8 2/	39,680	144	0.36	99.64	22,132	80	22,052	0	22,052
5b-9	73,600	11,466	15.58	84.42	54,962	8,563	46,399	5,240	51,639
5b-10	71,680	13,151	18.35	81.65	61,690	11,320	50,370	0	50,370
5b-11	57,600	31,214	54.19	45.81	31,542	17,093	14,449	0	14,449
5b-12	67,200	12,698	18.90	81.10	27,075	5,117	21,958	1,013	22,971
Total	5,402,240	2,359,032			2,738,626	1,482,316	1,256,310	27,436	1,283,746

1/ Data Source: Hydrologist data.
2/ PL-566.
3/ Wildlife.
4/ Area above C of E standard project flood.

Appendix table VI-2--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, economic plan, short range (10-15 years)

CNI Watershed Number	Watershed Area	Corps of Eng. 100 Yr. flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils 1/ Needing Drainage	Benefited Wet Soils: Corps	Benefited Wet Soils: SCS	Other SCS Benefited flood plain	Total SCS benefited area
	Acres								
St. Francis River Below Wappapello									
5-7	216,960	84,548	38.97	61.03	96,300	37,528	58,772	4,073	62,845
5-8	58,880	7,859	13.35	86.65	19,800	2,643	17,157	-	17,157
5-11a	26,880	5,728	21.31	78.69	15,200	3,239	11,961	-	11,961
5-13	136,960	24,173	17.65	82.35	47,065	8,307	38,758	4,500	43,258
5-14	49,920	9,347	18.72	81.28	21,193	3,967	17,226	35	17,261
5-19	238,592	138,622	58.10	41.90	186,679	108,460	78,219	-	78,219
5-26	62,720	51,209	81.65	18.35	48,127	39,296	8,831	-	8,831
5-27	62,720	-	-	100.00	41,030	-	41,030	-	41,030
5-33	66,176	51,392	77.66	22.34	34,399	26,714	7,685	-	7,685
5-33a	36,224	20,851	57.56	42.44	23,307	13,416	9,891	-	9,891
Subtotal	956,032	393,729			533,100	243,570	289,530	8,608	298,138
Little River System									
5a-1	150,400	59,229	39.38	60.62	105,800	41,664	64,136	2,562	66,698
5a-5	118,400	-	-	100.00	33,828	-	33,828	6,142	39,970
5a-6	85,120	72,175	84.16	15.84	59,300	49,907	9,393	60	9,453
5a-7	195,200	120,864	61.92	38.08	131,300	81,301	49,999	120	50,119
5a-8	184,960	154,374	82.61	17.39	104,200	86,080	18,120	200	18,320
5a-9	129,280	79,049	60.55	39.45	47,800	28,943	18,857	-	18,857
5a-10	197,120	103,108	52.31	47.69	112,340	58,765	53,575	-	53,575
Subtotal	1,060,480	588,799			594,568	346,660	247,908	9,084	256,992

Appendix table VI-2 (cont.)--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, economic plan, short range (10-15 years)

CNI Watershed Number	Watershed Area	Corps of Eng. 100 Yr. flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils 1/: Needing Drainage	Benefited Wet Soils: Corps	Benefited Wet Soils: SCS	Other SCS Benefited flood plain	Total SCS benefited area
	Acres								
				L'Anguille River					
5b-2	35,840	8,137	22.70	77.30	23,591	5,355	18,236	-	18,236
Subtotal	35,840	8,137			23,591	5,355	18,236	-	18,236
Total	2,052,352	990,665			1,151,259	595,585	555,674	17,692	573,366

1/ Data Source: Hydrologist data.

Appendix table VI-3--Structure data - multiple purpose channels
St. Francis River Basin, economic plan, short range, (10-15 years)

Watershed Number	Channel Improvement	Total Drainage Area	Drainage Area Controlled By Structures	Grade Stabilization Structures	Weirs for Habitat Enhancement	Channel Excavation
	(Miles)	(Sq. Mi.)	(Sq. Mi.)	(Number)	(Number)	(Cu. Yds.)
			St. Francis River Below Wappapello			
5-7	58	339.0	12.7	491	4	377,600
5-8	45	92.0	-	243	3	162,500
5-11a	36	42.0	-	292	-	196,100
5-13	51	214.0	28.8	210	1	225,200
5-14	37	78.0	1.7	150	4	220,000
5-19	367	372.8	-	1,473	3	500,000
5-26	89	98.0	-	355	9	536,200
5-27	67	98.0	-	267	2	207,500
5-33	50	103.4	-	200	15	800,000
5-33a	35	56.6	-	152	2	754,600
Subtotal	835	1,493.8	43.2	3,833	43	3,979,700
			Little River System			
5a-1	153	235.0	11.1	1,224	11	367,800
5a-5	50	185.0	13.8	422	1	390,800
5a-6	95	133.0	5.2	759	4	330,500
5a-7	188	305.0	1.2	1,504	6	1,482,400
5a-8	229	289.0	3.9	1,835	29	2,197,000
5a-9	105	202.8	-	849	6	226,200
5a-10	256	308.0	-	2,418	12	1,236,400
Subtotal	1,076	1,657.8	35.2	9,011	69	6,231,100
			L'Anguille River			
5b-2	48	56.0	-	200	-	938,100
Subtotal	48	56.0	-	200	-	938,100
Total	1,959	3,207.6	78.4	13,044	112	11,148,900

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Appendix table VI-4--Summary estimated structure cost distribution
St. Francis River Basin, economic plan, short range (10 - 15 years)

Item	Installation Cost - P. L. 566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engineering	Project admin.	Total P. L. 566	Construction	Project admin.	Land Easements & R/W	Total Non-Federal	
	Dollars 1/								
St. Francis River Below Wappapello Reservoir									
5-7	2,263,100	215,500	459,200	2,937,800	164,000	21,800	297,500	483,300	3,421,100
5-8	307,500	36,400	81,600	425,500	114,800	4,200	37,000	156,000	581,500
5-11a	264,800	31,400	67,700	363,900	92,200	3,400	20,000	115,600	479,500
5-13	3,167,900	290,600	611,100	4,069,600	83,600	29,200	576,000	688,800	4,758,400
5-14	377,600	39,800	83,500	500,900	68,100	3,900	72,000	144,000	644,900
5-19	1,200,400	141,900	317,100	1,659,400	447,200	15,600	125,000	587,800	2,247,200
5-26	396,600	46,600	110,600	553,800	160,300	5,900	62,000	228,200	782,000
5-27	143,400	16,800	41,200	201,400	62,000	2,300	35,000	99,300	300,700
5-33	341,700	40,000	99,000	480,700	150,400	5,300	29,000	184,700	665,400
5-33a	403,900	45,000	95,400	544,300	104,800	4,900	143,700	253,400	797,700
Subtotal	8,866,900	904,000	1,966,400	11,737,300	1,447,400	96,500	1,397,200	2,941,100	14,678,400
Little River System									
5a-1	2,683,700	268,900	580,400	3,533,000	364,800	28,300	248,000	641,100	4,174,100
5a-5	2,547,300	239,700	507,200	3,294,200	148,600	24,200	402,000	574,800	3,869,000
5a-6	1,212,700	125,900	274,500	1,613,100	226,900	13,600	85,000	325,500	1,938,600
5a-7	1,690,700	192,500	420,900	2,304,100	515,600	20,800	29,000	565,400	2,869,500
5a-8	2,418,900	269,800	603,600	3,292,300	712,300	30,100	58,500	800,900	4,093,200
5a-9	695,500	82,300	184,400	962,200	259,600	9,400	45,400	314,400	1,276,600
5a-10	1,602,400	189,500	426,100	2,218,000	602,600	21,400	208,000	832,000	3,050,000
Subtotal	12,851,200	1,368,600	2,997,100	17,216,900	2,830,400	147,800	1,075,900	4,054,100	21,271,000
L'Anguille River									
5b-2	447,000	100,100	50,000	597,100	109,000	2,500	136,500	248,000	845,100
Subtotal	447,000	100,100	50,000	597,100	109,000	2,500	136,500	248,000	845,100
Total	22,165,100	2,372,700	5,013,500	29,551,300	4,386,800	246,800	2,609,600	7,243,200	36,794,500

1/ Price base: 1970

Appendix table VI-5--Total installation and annual costs
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
		St. Francis River Below Wappapello Reservoir		
5-7	3,421,100	235,500	18,800	254,300
5-8	581,500	40,000	13,500	53,500
5-11a	479,500	33,000	10,400	43,400
5-13	4,758,400	327,500	20,000	347,500
5-14	644,900	44,400	11,400	55,800
5-19	2,247,200	154,700	101,800	256,500
5-26	782,000	53,800	23,000	76,800
5-27	300,700	20,700	17,000	37,700
5-33	665,400	45,800	12,400	58,200
5-33a	797,700	54,900	8,700	63,600
Subtotal	14,678,400	1,010,300	237,000	1,247,300
		Little River System		
5a-1	4,174,100	287,300	48,000	335,300
5a-5	3,869,000	266,300	20,100	286,400
5a-6	1,938,600	133,400	28,300	161,700
5a-7	2,869,500	197,500	54,200	251,700
5a-8	4,093,200	281,700	64,300	346,000
5a-9	1,276,600	87,900	29,200	117,100
5a-10	3,050,000	209,900	72,000	281,900
Subtotal	21,271,000	1,464,000	316,100	1,780,100
		L'Anguille River		
5b-2	845,100	58,200	4,800	63,000
Subtotal	845,100	58,200	4,800	63,000
Grand Total	36,794,500	2,532,500	557,900	3,090,400

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

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Appendix table VI-5a--Total installation and annual costs
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
		St. Francis River Below Wappapello Reservoir		
5-7	3,421,100	201,700	18,800	220,500
5-8	581,500	34,300	13,500	47,800
5-11a	479,500	28,300	10,400	38,700
5-13	4,758,400	280,500	20,000	300,500
5-14	644,900	38,000	11,400	49,400
5-19	2,247,200	132,500	101,800	234,300
5-26	782,000	46,100	23,000	69,100
5-27	300,700	17,700	17,000	34,700
5-33	665,400	39,200	12,400	51,600
5-33a	797,700	47,000	8,700	55,700
Subtotal	14,678,400	865,300	237,000	1,102,300
		Little River System		
5a-1	4,174,100	246,100	48,000	294,100
5a-5	3,869,000	228,100	20,100	248,200
5a-6	1,938,600	114,300	28,300	142,600
5a-7	2,869,500	169,200	54,200	223,400
5a-8	4,093,200	241,300	64,300	305,600
5a-9	1,276,600	75,300	29,200	104,500
5a-10	3,050,000	179,800	72,000	251,800
Subtotal	21,271,000	1,254,100	316,100	1,570,200
		L'Anguille River		
5b-2	845,100	49,800	4,800	54,600
Subtotal	845,100	49,800	4,800	54,600
Grand Total	36,794,500	2,169,200	557,900	2,727,100

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-6--Estimated annual damages and benefits 1/
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed	Crop and Pasture: Irrigated	Crop and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	Dollars									
St. Francis River below Wappapello Reservoir										
Estimated average annual damages 2/										
5-7	4,900	815,900	51,400	9,700	400	300	882,600	88,300	970,900	
5-8	10,100	51,900	24,400	4,500	-	-	90,900	9,100	100,000	
5-11a	30,000	97,200	8,400	1,600	-	-	137,200	13,700	150,900	
5-13	47,100	552,500	33,400	6,200	4,000	2,100	645,300	64,500	709,800	
5-14	123,000	126,100	12,200	2,300	100	100	263,800	26,400	290,200	
5-19	51,300	1,382,000	75,500	14,000	-	-	1,522,800	152,300	1,675,100	
5-26	34,800	428,900	24,200	4,400	-	-	492,300	49,200	541,500	
5-27	53,700	429,500	25,900	4,900	-	-	514,000	51,400	565,400	
5-33	51,300	210,900	12,800	2,400	-	-	277,400	27,700	305,100	
5-33a	-	235,900	-	-	-	-	235,900	23,600	259,500	
Total	406,200	4,330,800	268,200	50,000	4,500	2,500	5,062,200	506,200	5,568,400	
Estimated average annual benefits 3/										
5-7	2,700	424,800	37,500	8,400	400	300	474,100	47,400	521,500	286,200
5-8	5,500	26,900	19,500	4,000	-	-	55,900	5,600	61,500	28,700
5-11a	16,600	50,500	6,700	1,400	-	-	75,200	7,500	82,700	59,900
5-13	26,400	284,800	25,500	5,200	1,900	1,000	344,800	34,400	379,200	229,500
5-14	69,000	66,500	9,600	2,000	100	100	147,300	14,700	162,000	120,000
5-19	29,300	745,800	60,500	12,500	-	-	848,100	84,800	932,900	426,200
5-26	20,000	231,000	19,400	4,000	-	-	274,400	27,400	301,800	64,800
5-27	30,500	230,000	20,600	4,300	-	-	285,400	28,500	313,900	260,000
5-33	29,100	113,400	10,400	2,100	-	-	155,000	15,500	170,500	57,000
5-33a	-	119,300	-	-	-	-	119,300	11,900	131,200	83,200
Total	229,100	2,293,000	209,700	43,900	2,400	1,400	2,779,500	277,700	3,057,200	1,615,500

1/ 1974 current normalized prices
2/ Without additional Federal assistance
3/ With PL-566 assistance

Appendix table VI-6 (cont.)--Estimated annual damages and benefits 1/
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed	Crop and Pasture		Other Agri.	Roads & Bridges	Subtotal	Indirect	Total	Drainage
	Irrigated	Non-Irrigated						
	-Dollars							
				Little River System				
				Estimated average annual damages 2/				
5a-1	133,300	494,900	34,600	6,400	669,200	66,900	736,100	
5a-5	14,000	1,141,800	46,800	8,700	1,211,300	121,100	1,332,400	
5a-6	120,400	366,300	26,600	4,700	518,000	51,800	569,800	
5a-7	192,700	930,900	59,800	11,100	1,194,500	119,500	1,314,000	
5a-8	248,700	498,900	44,900	8,200	800,700	80,100	880,800	
5a-9	73,400	220,500	18,700	3,500	316,100	31,600	347,700	
5a-10	102,800	903,100	59,500	11,000	1,076,400	107,600	1,184,000	
Total	885,300	4,556,400	290,900	53,600	5,786,200	578,600	6,364,800	
				Estimated average annual benefits 3/				
5a-1	73,200	228,800	25,600	5,300	332,900	33,300	366,200	226,000
5a-5	700	360,400	19,500	4,200	384,800	38,500	423,300	101,500
5a-6	66,100	132,600	17,900	3,700	220,300	22,000	242,300	50,200
5a-7	106,300	422,400	47,800	9,900	586,400	58,600	645,000	272,000
5a-8	136,900	261,200	35,900	7,600	441,600	44,200	485,800	113,700
5a-9	40,300	115,000	14,900	3,200	173,400	17,300	190,700	90,100
5a-10	57,300	483,200	47,600	9,900	598,000	59,800	657,800	342,200
Total	480,800	2,003,600	209,200	43,800	2,737,400	273,700	3,011,100	1,195,700

1/ 1974 current normalized prices.
2/ Without additional Federal assistance.
3/ With PL-566 assistance.

Appendix table VI-6 (cont.)--Estimated annual damages and benefits 1/
St. Francis River Basin, economic plan, short range (10-15 years)

Watersheds	Crops and Pasture: Irrigated	Crops and Pasture: Non-irrigated	Other agri.	Roads & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
L'Anguille River											
Estimated average annual damages 2/											
5b-2	-	128,500	-	-	-	-	-	128,500	12,900	141,400	-
Subbasin total		128,500	-	-	-	-	-	128,500	12,900	141,400	-
Basin total	1,291,500	9,015,700	559,100	103,600	-	4,500	2,500	10,976,900	1,097,700	12,074,600	-
Estimated average annual benefits 3/											
5b-2	-	88,700	-	-	-	-	-	88,700	8,900	97,600	59,000
Subbasin total		88,700	-	-	-	-	-	88,700	8,900	97,600	59,000
Basin total	709,900	4,385,300	418,900	87,700	-	2,400	1,400	5,605,600	560,300	6,165,900	2,871,100

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VI-7--Comparison of benefits and costs for structural measures
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	- - - - - - - - - - - - - - - - - Dollars - - - - - - - - - - - - -				
			St. Francis River Below Wappapello Reservoir		
5-7	521,500	282,200	803,700	254,300	3.16:1
5-8	61,500	28,700	90,200	53,500	1.68:1
5-11a	82,700	59,900	142,600	43,400	3.28:1
5-13	379,200	229,500	608,700	347,500	1.75:1
5-14	162,000	120,000	282,000	55,800	5.05:1
5-19	932,900	426,200	1,359,100	256,500	5.29:1
5-26	301,800	64,800	366,600	76,800	4.77:1
5-27	313,900	260,000	573,900	37,700	15.22:1
5-33	170,500	57,000	227,500	58,200	3.90:1
5-33a	131,200	83,200	214,400	63,600	3.37:1
Subtotal	3,057,200	1,611,500	4,668,700	1,247,300	
			Little River System		
5a-1	366,200	226,000	592,200	335,300	1.76:1
5a-5	423,300	101,500	524,800	286,400	1.83:1
5a-6	242,300	50,200	292,500	161,700	1.80:1
5a-7	645,000	272,000	917,000	251,700	3.64:1
5a-8	485,800	113,700	599,500	346,000	1.73:1
5a-9	190,700	90,100	280,800	117,100	2.39:1
5a-10	657,800	342,200	1,000,000	281,900	3.54:1
Subtotal	3,011,100	1,195,700	4,206,800	1,780,100	
			L'Anguille River		
5b-2	97,600	59,900	157,500	63,000	2.50:1
Subtotal	97,600	59,900	157,500	63,000	
Total	6,165,900	2,867,100	9,033,000	3,090,400	

1/ 1974 current normalized prices.
2/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.

Appendix table VI-7a--Comparison of benefits and costs for structural measures
St. Francis River Basin, economic plan, short range (10 - 15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	- - - - - - - - - - - - - - - - - Dollars - - - - - - - - - - - - -				
			St. Francis River Below Wappapello Reservoir		
5-7	521,500	282,200	803,700	220,500	3.64:1
5-8	61,500	28,700	90,200	47,800	1.88:1
5-11a	82,700	59,900	142,600	38,700	3.68:1
5-13	379,200	229,500	608,700	300,500	2.03:1
5-14	162,000	120,000	282,000	49,400	5.71:1
5-19	932,900	426,200	1,359,100	234,300	5.80:1
5-26	301,800	64,800	366,600	69,100	5.30:1
5-27	313,900	260,000	573,900	34,700	16.54:1
5-33	170,500	57,000	227,500	51,600	4.41:1
5-33a	131,200	83,200	214,400	55,700	3.85:1
Subtotal	3,057,200	1,611,500	4,668,700	1,102,300	
			Little River System		
5a-1	366,200	226,000	592,200	294,100	2.01:1
5a-5	423,300	101,500	524,800	248,200	2.11:1
5a-6	242,300	50,200	292,500	142,600	2.05:1
5a-7	645,000	272,000	917,000	223,400	4.10:1
5a-8	485,800	113,700	599,500	305,600	1.96:1
5a-9	190,700	90,100	280,800	104,500	2.69:1
5a-10	657,800	342,200	1,000,000	251,800	2.97:1
Subtotal	3,011,100	1,195,700	4,206,800	1,570,200	
			L'Anguille River		
5b-2	97,600	59,900	157,500	54,600	2.88:1
Subtotal	97,600	59,900	157,500	54,600	
Total	6,165,900	2,867,100	9,033,000	2,727,100	

1/ 1974 current normalized prices.
2/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.

Appendix table VI-8--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, economic plan, long range

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Benefited wet soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
					St. Francis River Below Wappapello				
5-9	19,840	6,554	33.03	66.97	8,200	2,708	5,492	200	5,692
5-10	70,144	29,786	42.46	57.54	16,940	7,193	9,747	-	9,747
5-11	69,120	22,271	32.22	67.78	41,096	13,241	27,855	-	27,855
5-12	66,816	33,223	49.72	50.28	35,116	17,460	17,656	-	17,656
5-15	206,080	143,777	69.77	30.23	177,247	123,665	53,582	-	53,582
5-15a	30,720	-	-	100.00	21,500	-	21,500	-	21,500
5-15b	44,800	40,097	89.50	10.50	44,800	40,096	4,704	-	4,704
5-16	58,880	40,326	68.49	31.51	46,508	31,853	14,655	-	14,655
5-17	18,688	17,757	95.02	4.98	16,088	15,287	801	-	801
5-21	195,008	137,547	70.53	29.47	68,797	48,523	20,274	-	20,274
5-25	104,320	83,746	80.28	19.72	64,646	51,898	12,748	-	12,748
5-29	51,840	22,340	43.09	56.91	12,725	5,483	7,242	-	7,242
5-31	75,520	56,136	74.33	25.67	50,861	37,805	13,056	-	13,056
Subtotal	1,011,776	633,560			604,524	395,212	209,312	200	209,512
					Little River System				
5a-11	126,080	62,506	47.64	52.36	117,900	56,168	61,732	-	61,732
5a-12	83,200	74,467	89.50	10.50	59,887	53,599	6,288	-	6,288
Subtotal	209,280	136,973			177,787	109,767	68,020	-	68,020
Total	1,221,056	770,533			782,311	504,979	277,332	200	277,532

1/ Data source: Hydrologist data

Appendix table VI-9--Structure data - multiple purpose channels
St. Francis River Basin, economic plan, long range

Watershed Number	Channel Improvement	Total Drainage Area	Drainage Area Controlled By Structures	Grade Stabilization Structures	Weirs for Habitat Enhancement	Channel Excavation
	(Miles)	(Sq. Mi.)	(Sq. Mi.)	(Number)	(Number)	(Cu. Yd.)
			St. Francis River Below Wappapello			
5-9	17	31.0	-	95	-	170,000
5-10	19	109.6	28.2	5	2	355,500
5-11	81	108.0	-	527	5	391,400
5-12	50	104.4	-	203	2	137,400
5-15	256	322.0	-	2,053	4	500,800
5-15a	35	48.0	-	280	2	500,000
5-15b	72	70.0	-	578	4	241,000
5-16	38	92.0	-	146	-	90,000
5-17	38	29.2	-	140	-	365,500
5-21	225	304.7	-	922	10	663,500
5-25	76	163.0	-	312	1	170,000
5-29	94	81.0	-	378	2	490,000
5-31	128	118.0	-	486	4	270,600
Subtotal	1,129	1,580.9	28.2	6,125	36	4,345,700
			Little River System			
5a-11	225	197.0	-	1,636	3	2,265,000
5a-12	46	130.0	-	188	4	388,900
Subtotal	271	327.0	-	1,824	7	2,653,900
Total	1,400	1,907.9	28.2	7,949	43	6,999,600

Appendix table VI-10--Summary estimated structure cost distribution 1/
St. Francis River Basin, economic plan, long range

Item	Installation Cost - P.L. 566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engineering	Project admin.	Total P. L. 566	Construction	Project admin.	Land Easements & R/W	Total Non-Federal	
	Dollars								
St. Francis River Below Wappapello									
5-9	114,100	13,600	29,500	157,200	40,600	1,400	74,000	116,000	273,200
5-10	1,698,200	280,000	164,400	2,142,600	-	5,600	327,600	333,200	2,475,800
5-11	542,900	64,200	144,000	751,100	203,000	7,300	94,000	304,300	1,055,400
5-12	190,800	22,500	51,900	265,200	75,400	2,500	45,000	122,900	388,100
5-15	1,516,700	187,300	389,800	2,093,800	555,100	19,600	95,000	669,700	2,763,500
5-15a	158,500	19,500	42,000	220,000	54,700	2,000	38,300	95,000	315,000
5-15b	479,700	56,800	127,000	663,500	178,700	6,400	84,000	269,100	932,600
5-16	122,800	14,500	32,700	170,000	46,500	1,600	30,000	78,100	248,100
5-17	739,800	148,500	83,500	971,800	191,700	4,200	59,200	255,100	1,226,900
5-21	887,900	104,800	242,100	1,234,800	349,800	12,400	110,500	472,700	1,707,500
5-25	279,300	33,000	74,700	387,000	106,600	4,400	43,500	154,500	541,500
5-29	416,600	49,200	110,900	576,700	157,100	5,700	58,000	220,800	797,500
5-31	427,300	50,400	117,200	594,900	170,200	6,000	52,000	228,200	823,100
Subtotal	7,574,600	1,044,300	1,609,700	10,228,600	2,129,400	79,100	1,111,100	3,319,600	13,548,200
Little River Systems									
5a-11	1,781,500	211,300	460,400	2,453,200	634,300	22,600	137,500	794,400	3,247,600
5a-12	167,200	19,600	47,300	234,100	70,200	2,600	27,000	99,800	333,900
Subtotal	1,948,700	230,900	507,700	2,687,300	704,500	25,200	164,500	894,200	3,581,500
Total	9,523,300	1,275,200	2,117,400	12,915,900	2,833,900	104,300	1,275,600	4,213,800	17,129,700

1/ Price base: 1970

Appendix table VI-11--Total installation and annual costs
St. Francis River Basin, economic plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
	St. Francis River Below Wappapello Reservoir			
5-9	273,200	18,800	2,400	21,200
5-10	2,475,800	170,400	9,900	180,300
5-11	1,055,400	72,600	22,300	94,900
5-12	388,100	26,700	13,500	40,200
5-15	2,763,500	190,200	72,100	262,300
5-15a	315,000	21,700	10,500	32,200
5-15b	932,600	64,200	20,100	84,300
5-16	248,100	17,100	12,700	29,800
5-17	1,226,900	84,400	12,600	97,000
5-21	1,707,500	117,500	60,300	177,800
5-25	541,500	37,300	20,800	58,100
5-29	797,500	54,900	25,800	80,700
5-31	823,100	56,700	26,600	83,300
Subtotal	13,548,200	932,500	309,600	1,242,100
	Little River System			
5a-11	3,247,600	223,500	64,000	287,500
5a-12	333,900	23,000	11,600	34,600
Subtotal	3,581,500	246,500	75,600	322,100
Total	17,129,700	1,179,000	385,200	1,564,200

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-11a--Total installation and annual costs
St. Francis River Basin, economic plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
	St. Francis River Below Wappapello Reservoir			
5-9	273,200	16,100	2,400	18,500
5-10	2,475,800	145,900	9,900	155,800
5-11	1,055,400	62,200	22,300	84,500
5-12	388,100	22,900	13,500	36,400
5-15	2,763,500	162,900	72,100	235,000
5-15a	315,000	18,600	10,500	29,100
5-15b	932,600	55,000	20,100	75,100
5-16	248,100	14,600	12,700	27,300
5-17	1,226,900	72,300	12,600	84,900
5-21	1,707,500	100,700	60,300	161,000
5-25	541,500	31,900	20,800	52,700
5-29	797,500	47,000	25,800	72,800
5-31	823,100	48,500	26,600	75,100
Subtotal	13,548,200	798,600	309,600	1,108,200
	Little River System			
5a-11	3,247,600	191,400	64,000	255,400
5a-12	333,900	19,700	11,600	31,300
Subtotal	3,581,500	211,100	75,600	286,700
Total	17,129,700	1,009,700	385,200	1,394,900

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-12--Estimated damages and benefits 1/
St. Francis River Basin, economic plan, long range

Watersheds	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Urban	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	- Dollars -										
					St. Francis River Below Wappapello Reservoir						
					Estimated average annual damages 2/						
5-9	-	59,800	4,100	600		600	600	65,700	6,600	72,300	
5-10	-	323,400	7,200	11,300	2,900	31,700	9,800	386,300	38,600	424,900	
5-11	45,300	293,200	19,900	3,700				362,100	36,200	398,300	
5-12	17,600	255,000	15,600	2,900				291,100	29,100	320,200	
5-15	27,100	811,300	58,700	11,000				908,100	90,800	998,900	
5-15a	10,800	105,200	18,900	3,500				138,400	13,800	152,200	
5-15b	41,200	158,500	12,200	2,400				214,300	21,400	235,700	
5-16	25,100	394,700	23,100	4,300				447,200	44,700	491,900	
5-17	-	106,300	-	3,100				109,400	10,900	120,300	
5-21	162,500	330,200	25,500	4,700				522,900	52,300	575,200	
5-25	17,400	285,000	15,700	2,900				321,000	32,100	353.100	
5-29	18,800	122,800	7,400	1,200				150,200	15,000	165,200	
	37,800	256,500	15,000	2,700				312,000	31,200	343,200	
Total	403,600	3,501,900	223,300	54,300	2,900	32,300	10,400	4,228,700	422,700	4,651,400	
					Estimated average annual benefits 3/						
5-9	-	30,300	3,200	600		300	300	34,700	3,500	38,200	26,000
5-10	-	180,100	6,000	9,300	2,500	20,400	6,700	225,000	22,500	247,500	4/ 15,000
5-11	6,200	171,500	17,300	3,500				198,500	19,900	218,400	142,500
5-12	9,900	135,900	12,600	2,600				161,000	16,100	177,100	102,000
5-15	15,000	421,700	47,100	9,800				493,600	49,400	543,000	211,800
5-15a	9,100	55,100	15,100	3,200				82,500	8,300	90,800	64,400
5-15b	22,600	83,300	9,800	2,000				117,700	11,800	129,500	21,500
5-16	14,300	211,300	18,500	3,800				247,900	24,800	272,700	88,400
5-17	-	96,800	-	1,800				98,600	9,900	108,500	70,400
5-21	91,200	175,700	20,400	4,200				291,500	29,200	320,700	121,400
5-25	9,900	153,800	12,700	2,600				179,000	17,900	196,900	58,500
5-29	10,700	66,000	6,000	1,200				83,900	8,400	92,300	49,600
5-31	21,600	138,100	12,100	2,500				174,300	17,400	191,700	72,700
Total	210,500	1,919,600	180,800	47,100	2,500	20,700	7,000	2,388,200	239,100	2,627,300	1,029,200
											4/ 15,000

1/ 1974 current normalized prices. 2/ Without addition Federal assistance. 3/ With PL-566 assistance. 4/ Incidental recreation.

Appendix table VI-12 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, economic plan, long range

Watershed	Crops and pasture: Irrigated	Crops and pasture: Non-irrigated	Other agri.	Roads & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
Little River System											
Estimated average annual damages 2/											
5a-11	91,200	634,500	41,000	7,600	-	-	-	774,300	77,400	851,700	-
5a-12	6,800	161,000	9,300	1,800	-	-	-	178,900	17,900	196,800	-
Total	98,000	795,500	50,300	9,400	-	-	-	953,200	95,300	1,048,500	-
Basin Total	501,600	4,297,400	273,600	63,700	2,900	32,300	10,400	5,181,900	518,000	5,699,900	-
Estimated average annual benefits 3/											
5a-11	47,100	335,700	32,800	6,800	-	-	-	422,400	42,200	464,600	238,700
5a-12	3,800	86,100	7,400	1,600	-	-	-	98,900	9,900	108,800	32,100
Total	50,900	421,800	40,200	8,400	-	-	-	521,300	52,100	573,400	270,800
Basin Total	261,400	2,341,400	221,000	55,500	2,500	20,700	7,000	2,909,500	291,200	3,200,700	1,300,000 15,000 4/

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.
4/ Incidental recreation.

Appendix table VI-13--Comparison of benefits and costs for structural measures
St. Francis River Basin, economic plan, long range

Watershed	Damage Reduction	Agricultural Water Management	Total	Average Annual Cost 1/	Benefit to Cost Ratio
		Dollars 2/			
		St. Francis River Below Wappapello Reservoir			
5-9	38,200	26,000	64,200	21,200	3.02:1
5-10	247,500	3/ 15,000	262,500	180,300	1.45:1
5-11	218,400	142,500	360,900	94,900	3.80:1
5-12	177,100	102,000	279,100	40,200	6.94:1
5-15	543,000	211,800	864,800	262,300	3.29:1
5-15a	90,800	64,400	155,200	32,200	4.81:1
5-15b	129,500	21,500	151,000	84,300	1.79:1
5-16	272,700	88,400	361,100	29,800	12.11:1
5-17	108,500	70,400	178,900	97,000	1.84:1
5-21	320,700	121,400	442,100	177,800	2.37:1
5-25	196,900	58,500	255,400	58,100	4.37:1
5-29	92,300	49,600	141,900	80,700	1.75:1
5-31	191,700	72,700	264,400	83,300	3.17:1
Subtotal	2,537,300	1,029,200 3/ 15,000	3,766,500 3/ 15,000	1,242,100	
		Little River System			
5a-11	464,600	238,700	703,300	287,500	2.44:1
5a-12	108,800	32,100	140,900	34,600	4.07:1
Subtotal	573,400	270,800	844,200	322,100	
Total	3,200,700	1,315,000	4,625,700	1,564,200	

1/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.
2/ 1974 current normalized prices.
3/ Incidental recreation.

Appendix table VI-13a--Comparison of benefits and costs for structural measures
St. Francis River Basin, economic plan, long range

Watershed	Damage Reduction	Agricultural Water Management	Total	Average Annual Cost 1/	Benefit to Cost Ratio
		Dollars 2/			
		St. Francis River Below Wappapello Reservoir			
5-9	38,200	26,000	64,200	18,500	3.47:1
5-10	247,500	3/ 15,000	262,500	155,800	1.68:1
5-11	218,400	142,500	360,900	84,500	4.27:1
5-12	177,100	102,000	279,100	36,400	7.67:1
5-15	543,000	211,800	864,800	235,000	3.68:1
5-15a	90,800	64,400	155,200	29,100	5.33:1
5-15b	129,500	21,500	151,000	75,100	2.01:1
5-16	272,700	88,400	361,100	27,300	13.23:1
5-17	108,500	70,400	178,900	84,900	2.11:1
5-21	320,700	121,400	442,100	161,000	2.75:1
5-25	196,900	58,500	255,400	52,700	4.85:1
5-29	92,300	49,600	141,900	72,800	1.95:1
5-31	191,700	72,700	264,400	75,100	3.52:1
Subtotal	2,627,300	1,029,200 3/ 15,000	3,766,500 3/ 15,000	1,108,200	
		Little River System			
5a-11	464,600	238,700	703,300	255,400	2.75:1
5a-12	108,800	32,100	140,900	31,300	4.50:1
Subtotal	573,400	270,800	844,200	286,700	
Total	3,200,700	1,315,000	4,625,700	1,394,900	

1/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.
2/ 1974 current normalized prices.
3/ Incidental recreation.

Appendix table VI-14--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, economic plan, not feasible for PL-566

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Benefited wet soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
				St. Francis River Above Wappapello					
5-1	223,360	-	-	100.00	-	-	-	-	-
5-2	88,960	-	-	100.00	-	-	-	-	-
5-3	173,440	-	-	100.00	-	-	-	-	-
5-4	126,080	-	-	100.00	-	-	-	-	-
5-5	195,840	-	-	100.00	-	-	-	-	-
5-5a	30,720	-	-	100.00	-	-	-	-	-
Subtotal	838,400	-	-		-	-	-	-	-
				St. Francis River Below Wappapello					
5-20 2/	80,640	53,730	66.63	33.37	80,570	-	-	-	-
5-23 2/	119,040	49,285	41.40	58.60	39,338	-	-	-	-
5-24	87,040	77,903	89.50	10.50	64,097	57,367	0	-	0
5-28	90,880	81,111	89.25	10.75	59,219	52,853	0	-	0
5-30	66,560	59,573	89.50	10.50	36,518	32,684	0	-	0
5-32	49,280	43,534	88.34	11.66	32,402	28,624	0	-	0
5-34	94,080	83,631	88.89	11.11	48,365	42,992	0	-	0
5-35	27,520	13,037	47.37	52.63	9,849	4,665	0	-	0
5-35a	16,000	1,053	6.58	93.42	5,106	336	0	-	0
Subtotal	631,040	462,847			375,464	219,521	0	-	0
				Little River System					
5a-0 2/	8,960	8,960	100.00	-	-	-	-	-	-
5a-3	9,600	343	3.57	96.43	2,570	92	0	-	-
5a-11a 3/	24,960	22,340	89.50	10.50	23,050	-	-	-	-
Subtotal	43,520	31,643			25,620	92	0	-	0

Appendix table VI-14 (cont.)--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, economic plan, not feasible for PL-566

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Benefited wet soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
					L'Anguille River				
5b-1	23,680	13,275	56.06	43.94	16,567	9,287	0	-	0
5b-3	44,160	10,418	23.59	76.41	27,261	6,431	0	-	0
5b-4	31,360	2,876	9.17	90.83	27,251	2,499	0	-	0
5b-5	56,320	8,732	15.50	84.50	35,504	5,503	0	0	0
5b-6	42,240	3,514	8.32	91.68	41,700	3,469	0	-	0
5b-7	56,960	1,827	3.21	96.79	46,471	1,492	0	-	0
5b-9	73,600	11,466	15.58	84.42	54,962	8,563	0	0	0
5b-10	71,680	13,151	18.35	81.65	61,690	11,320	0	-	0
5b-11	57,600	31,214	54.19	45.81	31,542	17,093	0	-	0
5b-12	67,200	12,698	18.90	81.10	27,075	5,117	0	0	0
Subtotal	524,800	109,171			370,023	70,774	0	0	0
Total	2,037,760	603,671			771,107	290,387	0	0	0

1/ Data source: Hydroligist data
2/ Floodway
3/ Wildlife

Appendix table VI-15--Structure data - multiple purpose channels
St. Francis River Basin, economic plan, not feasible for PL-566

Watershed number	Channel improvement	Total drainage area	Drainage area controlled by structures	Grade stabilization structures	Weirs for habitat enhancement	Channel excavation
	(Miles)	(Sq. Mi.)	(Sq. Mi.)	(Number)	(Number)	(Cu. Yd.)
St. Francis River Above Wappapello						
5-1	-	349.0	-	-	-	-
5-2	-	139.0	-	-	-	-
5-3	-	271.0	-	-	-	-
5-4	-	197.0	-	-	-	-
5-5	-	306.0	-	-	-	-
5-5a	-	48.0	-	-	-	-
Subtotal	-	1,310.0	-	-	-	-
St. Francis River Below Wappapello						
5-20	-	126.0	-	-	-	-
5-23	-	186.0	-	-	-	-
5-24	-	136.0	-	-	-	-
5-28	-	142.0	-	-	-	-
5-30	-	104.0	-	-	-	-
5-32	-	77.0	-	-	-	-
5-34	-	147.0	-	-	-	-
5-35	-	43.0	-	-	-	-
5-35a	-	25.0	-	-	-	-
Subtotal	-	986.0	-	-	-	-
Little River System						
5a-0	-	14.0	-	-	-	-
5a-3	-	15.0	-	-	-	-
5a-11a	-	39.0	-	-	-	-
Subtotal	-	68.0	-	-	-	-
L'Anguille River						
5b-1	-	37.0	-	-	-	-
5b-3	-	69.0	-	-	-	-
5b-4	-	49.0	-	-	-	-
5b-5	-	88.0	-	-	-	-
5b-6	-	66.0	-	-	-	-
5b-7	-	89.0	-	-	-	-
5b-9	-	115.0	-	-	-	-
5b-10	-	112.0	-	-	-	-
5b-11	-	90.0	-	-	-	-
5b-12	-	105.0	-	-	-	-
Subtotal	-	820.0	-	-	-	-
Total	-	3,184.0	-	-	-	-

Appendix table VI-16--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, no Federal plan, not feasible for PL-566

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Other SCS benefited area	Total benefited area
			Corps	SCS			
	Acres						
			St. Francis River Above Wappapello				
5-1	223,360	0	0	100.00	0	0	0
5-2	88,960	0	0	100.00	0	0	0
5-3	173,440	0	0	100.00	0	0	0
5-4	126,080	0	0	100.00	0	0	0
5-5	195,840	0	0	100.00	0	0	0
5-5a	30,720	0	0	100.00	0	0	0
Subtotal	838,400	0	0		0	0	0
			St. Francis River Below Wappapello				
5-20 2/	80,640	53,730	66.63	33.37	80,570	0	0
5-23 2/	119,040	49,285	41.40	58.60	39,338	0	0
5-24	87,040	77,903	89.50	10.50	64,097	0	0
5-28	90,880	81,111	89.25	10.75	59,219	0	0
5-30	66,560	59,573	89.50	10.50	36,518	0	0
5-32	49,280	43,534	88.34	11.66	32,402	0	0
5-34	94,080	83,631	88.89	11.11	48,365	0	0
5-35	27,520	13,037	47.37	52.63	9,849	0	0
5-35a	16,000	1,053	6.58	93.42	5,106	0	0
Subtotal	631,040	462,857			375,464	0	0
			Little River System				
5a-0 2/	8,960	8,960	100.00	0	-	-	-
5a-3	9,600	343	3.57	96.43	2,750	0	0
5a-11a 3/	24,960	22,340	89.50	10.50	23,050	-	-
Subtotal	43,520	31,643			25,620	0	0

Appendix table VI-16 (cont.)--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, no Federal plan, not feasible for PL-566

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Other SCS benefited area	Total benefited area
			Corps	SCS			
	Acres						
			L'Anguille River				
5b-1	23,680	13,275	56.06	43.94	16,567	0	0
5b-3	44,160	10,418	23.59	76.41	27,261	0	0
5b-4	31,360	2,876	9.17	90.83	27,251	0	0
5b-5	56,320	8,732	15.50	84.50	35,504	0	0
5b-6	42,240	3,514	8.32	91.68	41,700	0	0
5b-7	56,960	1,827	3.21	96.79	46,471	0	0
5b-9	73,600	11,466	15.58	84.42	54,962	0	0
5b-10	71,680	13,151	18.35	81.65	61,690	0	0
5b-11	57,600	31,214	54.19	45.81	31,542	0	0
5b-12	67,200	12,698	18.90	81.10	27,075	0	0
Subtotal	524,800	109,171			370,023	0	0
Total	2,037,760	603,671			771,107	0	0

1/ Data source: Hydrologist data
2/ Floodway
3/ Wildlife

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Appendix table VI-17--Structure data - multiple purpose channels
St. Francis River Basin, no Federal plan, not feasible for PL-566

Watershed number	Channel improvement	Total drainage area	Drainage area controlled by structures	Grade stabilization structures	Weirs for habitat enhancement	Channel excavation
	(Miles)	(Sq. Mi.)	(Sq. Mi.)	(Number)	(Number)	(Cu. Yd.)
St. Francis River Above Wappapello						
5-1	-	349.0	-	-	-	-
5-2	-	139.0	-	-	-	-
5-3	-	271.0	-	-	-	-
5-4	-	197.0	-	-	-	-
5-5	-	306.0	-	-	-	-
5-5a	-	48.0	-	-	-	-
Subtotal	-	1,310.0	-	-	-	-
St. Francis River Below Wappapello						
5-20	-	126.0	-	-	-	-
5-23	-	186.0	-	-	-	-
5-24	-	136.0	-	-	-	-
5-28	-	142.0	-	-	-	-
5-30	-	104.0	-	-	-	-
5-32	-	77.0	-	-	-	-
5-34	-	147.0	-	-	-	-
5-35	-	43.0	-	-	-	-
5-35a	-	25.0	-	-	-	-
Subtotal	-	986.0	-	-	-	-
Little River System						
5a-0	-	14.0	-	-	-	-
5a-3	-	15.0	-	-	-	-
5a-11a	-	39.0	-	-	-	-
Subtotal	-	68.0	-	-	-	-
L'Anguille River						
5b-1	-	37.0	-	-	-	-
5b-3	-	69.0	-	-	-	-
5b-4	-	49.0	-	-	-	-
5b-5	-	88.0	-	-	-	-
5b-6	-	66.0	-	-	-	-
5b-7	-	89.0	-	-	-	-
5b-9	-	115.0	-	-	-	-
5b-10	-	112.0	-	-	-	-
5b-11	-	90.0	-	-	-	-
5b-12	-	105.0	-	-	-	-
Subtotal	-	820.0	-	-	-	-
Total	-	3,184.0	-	-	-	-

Appendix table VI-18--Total installation and annual cost of structural measures St. Francis River Basin, environmental plan

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
	St. Francis River Above Wappapello Reservoir			
5-1	1,000,000	68,800	1,500	70,300
5-2	600,000	41,300	1,000	42,300
5-3	600,000	41,300	1,500	42,800
5-4	600,000	41,300	1,500	42,800
5-5	-	-	-	-
5-5a	-	-	-	-
Total	2,800,000	192,700	5,500	198,200

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-18a--Total installation and annual cost of structural measures
St. Francis River Basin, environmental plan

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
	St. Francis River Above Wappapello Reservoir			
5-1	1,000,000	58,900	1,500	60,400
5-2	600,000	35,400	1,000	36,400
5-3	600,000	35,400	1,500	36,900
5-4	600,000	35,400	1,500	36,900
5-5	-	-	-	-
5-5a	-	-	-	-
Total	2,800,000	165,100	5,500	170,600

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-19--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, environmental plan, short range (10 - 15 years)

CNI wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Benefited wet soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
					St. Francis River Below Wappapello				
5-7	216,960	84,548	38.97	61.03	96,300	37,528	58,772	4,073	62,845
5-8	58,880	7,859	13.35	86.65	19,800	2,643	17,157	-	17,157
5-11a	26,880	5,728	21.31	78.69	15,200	3,239	11,961	-	11,961
5-13	136,960	24,173	17.65	82.35	47,065	8,307	38,758	4,500	43,258
5-14	49,920	9,347	18.72	81.28	21,193	3,967	17,226	35	17,261
5-19	238,592	138,622	58.10	41.90	186,679	108,460	78,219	-	78,219
5-26	62,720	51,209	81.65	18.35	48,127	39,296	8,831	-	8,831
5-27	62,720	-	-	100.00	41,030	-	41,030	-	41,030
5-33	66,176	51,392	77.66	22.34	34,399	26,714	7,685	-	7,685
5-33a	36,224	20,851	57.56	42.44	23,307	13,416	9,891	-	9,891
Subtotal	956,032	393,729			533,100	243,570	289,530	8,608	298,138
					Little River System				
5a-1	150,400	59,229	39.38	60.62	105,800	41,664	64,136	2,562	66,698
5a-5	118,400	-	-	100.00	33,828	-	33,828	6,142	39,970
5a-6	85,120	72,175	84.16	15,84	59,300	49,907	9,393	60	9,453
5a-7	195,200	120,864	61.92	38.08	131,300	81,301	49,999	120	50,119
5a-8	184,960	154,374	82.61	17.39	104,200	86,080	18,120	200	18,320
5a-9	129,280	79,049	60.55	39.45	47,800	28,943	18,857	-	18,857
5a-10	197,120	103,108	52.31	47.69	112,340	58,765	53,575	-	53,575
Subtotal	1,060,480	588,799			594,568	346,660	247,908	9,084	256,992
					L'Anguille River				
5b-2	35,840	8,137	22.70	77.30	23,591	5,355	18,236	-	18,236
Subtotal	35,840	8,137			23,591	5,355	18,236	-	18,236
Total	2,052,352	990,665			1,151,259	595,585	555,674	17,692	573,366

1/ Data source: Hydrologist data

Appendix table VI-20--Structure data - multiple purpose channels
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed number	Channel improvement	Total drainage area	Drainage area controlled by structures	Grade stabilization structures	Weirs for habitat enhancement	Channel excavation
	Miles	Sq.mi.	Sq.mi.	Number	Number	Cu.yd.
			St. Francis River Below Wappapello			
5-7	58	339.0	20.0	491	4	377,600
5-8	45	92.0	-	243	3	162,500
5-11a	36	42.0	-	292	-	196,100
5-13	51	214.0	28.8	210	1	225,200
5-14	37	78.0	1.7	150	4	220,000
5-19	367	372.8	-	1,473	3	500,000
5-26	89	98.0	-	355	9	536,200
5-27	67	98.0	-	267	2	207,500
5-33	50	103.4	-	200	15	800,000
5-33a	35	56.6	-	152	2	754,600
Subtotal	835	1,493.8	50.5	3,833	43	3,979,700
			Little River System			
5a-1	153	235.0	11.1	1,224	11	367,800
5a-5	50	185.0	13.8	422	1	390,800
5a-6	95	133.0	5.2	759	4	330,500
5a-7	188	305.0	1.2	1,504	6	1,482,400
5a-8	229	289.0	3.9	1,835	29	2,197,000
5a-9	105	202.0	-	849	6	226,200
5a-10	256	308.0	-	2,418	12	1,236,400
Subtotal	1,076	1,657.0	35.2	9,011	69	6,231,100
			L'Anguille River			
5b-2	48	56.0	-	200	-	938,100
Subtotal	48	56.0	-	200	-	938,100
Total	1,959	3,206.8	85.7	13,044	112	11,148,900

Appendix table VI-21--Summary estimated structure cost distribution 1/
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Item	Installation Cost - P.L. 566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engineering	Project admin.	Total P.L. 566	Construction	Project admin.	Land Easements & R/W	Total Non-Federal	
	Dollars								
Below Wappapello Reservoir									
5-7	2,862,500	276,600	558,200	3,697,300	164,000	25,200	339,000	528,200	4,225,500
5-8	467,200	56,400	101,600	625,200	114,800	4,200	37,000	156,000	781,200
5-11a	276,400	32,900	69,200	378,500	92,200	3,400	20,000	115,600	494,100
5-13	3,384,200	317,700	638,200	4,340,100	83,600	29,200	576,000	688,800	5,028,900
5-14	409,600	43,800	87,500	540,900	68,100	3,900	72,000	144,000	684,900
5-19	1,455,100	173,700	348,900	1,977,700	447,200	15,600	125,000	587,800	2,565,500
5-26	520,900	62,200	126,200	709,300	160,300	5,900	62,000	228,200	937,500
5-27	345,800	42,100	66,500	454,400	62,000	2,300	35,000	99,300	553,700
5-33	671,100	81,200	140,200	892,500	150,400	5,300	29,000	184,700	1,077,200
5-33a	431,500	48,500	98,900	578,900	104,800	4,900	143,700	253,400	832,300
Subtotal	10,824,300	1,135,100	2,235,400	14,194,800	1,447,400	99,900	1,438,700	2,986,000	17,180,800
Little River System									
5a-1	3,067,900	316,900	628,400	4,013,200	364,800	28,300	248,000	641,100	4,654,300
5a-5	3,137,300	313,400	580,900	4,031,600	148,600	24,200	402,000	574,800	4,606,400
5a-6	1,444,000	154,800	303,400	1,902,200	226,900	13,600	85,000	325,500	2,227,700
5a-7	1,878,400	216,000	444,400	2,538,800	515,600	20,800	29,000	565,400	3,104,200
5a-8	2,816,900	319,600	653,400	3,789,900	712,300	30,100	58,500	800,900	4,590,800
5a-9	858,200	102,600	204,700	1,165,500	259,600	9,400	45,400	314,400	1,479,900
5a-10	1,807,800	215,200	451,800	2,474,800	602,600	21,400	208,000	832,000	3,306,800
Subtotal	15,010,500	1,638,500	3,267,000	19,916,000	2,830,400	147,800	1,075,900	4,054,100	23,970,100
L'Anguille River									
5b-2	527,000	110,100	60,000	697,100	109,000	2,500	136,500	248,000	945,100
Subtotal	527,000	110,100	60,000	697,100	109,000	2,500	136,500	248,000	945,100
Total	26,361,800	2,883,700	5,562,400	34,807,900	4,386,800	250,200	2,651,100	7,288,100	42,096,000

1/ Price base: 1970

Appendix table VI-22--Total installation and annual cost of structural measures
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed number	Total installation cost	Amortization of installation cost 1/	Operation and maintenance cost 2/	Total
	Dollars			
		St. Francis River Below Wappapello Reservoir		
5-7	4,225,500	290,800	23,200	314,000
5-8	781,200	53,800	15,500	69,300
5-11a	494,100	34,000	10,700	44,700
5-13	5,028,900	346,100	21,100	367,200
5-14	684,900	47,100	12,100	59,200
5-19	2,565,500	176,600	116,200	292,800
5-26	937,500	64,500	27,600	92,100
5-27	553,700	38,100	31,300	69,400
5-33	1,077,200	74,100	20,000	94,100
5-33a	832,300	57,300	9,000	66,300
Subtotal	17,180,800	1,182,400	286,700	1,469,100
		Little River System		
5a-1	4,654,300	320,400	53,500	373,900
5a-5	4,606,400	317,100	24,000	341,100
5a-6	2,227,700	153,300	32,500	185,800
5a-7	3,104,200	213,700	58,700	272,400
5a-8	4,590,800	316,000	72,100	388,100
5a-9	1,479,900	101,900	33,900	135,800
5a-10	3,306,800	227,600	78,300	305,900
Subtotal	23,970,100	1,650,000	353,000	2,003,000
		L'Anguille River		
5b-2	945,100	65,100	5,400	70,500
Subtotal	945,100	65,100	5,400	70,500
Total	42,096,000	2,897,500	645,100	3,542,600

1/ Price base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.
2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

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Appendix table VI-22a--Total installation and annual cost of structural measures
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed number	Total installation cost	Amortization of installation cost 1/	Operation and maintenance cost 2/	Total
	Dollars			
	St. Francis River Below Wappapello Reservoir			
5-7	4,225,500	249,100	23,200	272,300
5-8	781,200	46,100	15,500	61,600
5-11a	494,100	29,100	10,700	39,800
5-13	5,028,900	296,500	21,100	317,600
5-14	684,900	40,400	12,100	52,500
5-19	2,565,500	151,200	116,200	267,400
5-26	937,500	55,300	27,600	82,900
5-27	553,700	32,600	31,300	63,900
5-33	1,077,200	63,500	20,000	83,500
5-33a	832,300	49,100	9,000	58,100
Subtotal	17,180,800	1,012,900	286,700	1,299,600
	Little River System			
5a-1	4,654,300	274,400	53,500	327,900
5a-5	4,606,400	271,500	24,000	295,500
5a-6	2,227,700	131,300	32,500	163,800
5a-7	3,104,200	183,000	58,700	241,700
5a-8	4,590,800	270,600	72,100	342,700
5a-9	1,479,900	87,200	33,900	121,100
5a-10	3,306,800	194,900	78,300	273,200
Subtotal	23,970,100	1,412,900	353,000	1,765,900
	L'Anguille River			
5b-2	945,100	55,700	5,400	61,100
Subtotal	945,100	55,700	5,400	61,100
Total	42,096,000	2,481,500	645,100	3,126,600

1/ Price base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.
2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-23--Estimated annual damages and benefits
St. Francis River Basin, environmental plan, short range (10-15 years)

Watershed	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	Dollars 1/									
St. Francis River Below Wappapello Reservoir										
Estimated Average Annual Damages 2/										
5-7	4,900	815,900	51,400	9,700	400	300	882,600	88,300	970,900	
5-8	10,100	51,900	24,400	4,500	-	-	90,900	9,100	100,000	
5-11a	30,000	97,200	8,400	1,600	-	-	137,200	13,700	150,900	
5-13	47,100	552,500	33,400	6,200	4,000	2,100	645,300	64,500	709,800	
5-14	123,000	126,100	12,200	2,300	100	100	263,800	26,400	290,200	
5-19	51,300	1,382,000	75,500	14,000	-	-	1,522,800	152,300	1,675,100	
5-26	34,800	428,900	24,200	4,400			492,300	49,200	541,500	
5-27	53,700	429,500	25,900	4,900			514,000	51,400	565,400	
5-33	51,300	210,900	12,800	2,400			277,400	27,700	305,100	
5-33a	-	235,900	-	-			235,900	23,600	259,500	
Total	406,200	4,330,800	268,200	50,000	4,500	2,500	5,062,200	506,200	5,568,400	
Estimated Average Annual Benefits 3/										
5-7	2,700	427,800	37,500	8,400	400	200	477,000	47,700	524,700	286,200
5-8	5,500	26,900	19,500	4,000	-	-	55,900	5,600	61,500	28,700
5-11a	16,600	50,500	6,700	1,400	-	-	75,200	7,500	82,700	59,900
5-13	26,400	248,800	25,500	5,200	1,900	1,000	308,800	30,900	339,700	229,500
5-14	69,000	66,500	9,600	2,000	100	100	147,300	14,700	162,000	120,000
5-19	29,300	745,800	60,500	12,500	-	-	848,100	84,800	932,900	426,200
5-26	20,000	231,000	19,400	4,000	-	-	274,400	27,400	301,800	64,800
5-27	30,500	230,000	20,600	4,300	-	-	285,400	28,500	313,900	260,000
5-33	29,100	113,400	10,400	2,100	-	-	155,000	15,500	170,500	57,000
5-33a	-	119,300	-	-			119,300	11,900	131,200	83,200
Total	229,100	2,260,000	209,700	43,900	2,400	1,300	2,746,400	274,500	3,020,900	1,615,500

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VI-23 (cont.)--Estimated annual damages and benefits
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Subtotal	Indirect	Total	Drainage
	Dollars 1/							
				Little River System				
				Estimated Average Annual Damages 2/				
5a-1	133,300	494,900	34,600	6,400	669,200	66,900	736,100	
5a-5	1,400	1,111,000	48,800	8,700	1,169,900	117,000	1,286,900	
5a-6	120,400	356,400	26,600	4,700	508,100	50,800	558,900	
5a-7	192,700	905,800	59,800	11,100	1,169,400	116,900	1,286,300	
5a-8	248,700	485,400	44,900	8,200	787,200	78,700	865,900	
5a-9	73,400	214,600	18,700	3,500	310,200	31,000	341,200	
5a-10	102,800	903,100	59,500	11,000	1,076,400	107,600	1,184,000	
Total	872,700	4,471,200	292,900	53,600	5,690,400	568,900	6,259,300	
				Estimated Average Annual Benefits 3/				
5a-1	73,200	228,800	25,600	5,300	332,900	33,300	366,200	226,000
5a-5	700	360,400	19,500	4,200	384,800	38,500	423,300	101,500
5a-6	66,100	132,600	17,900	3,700	220,300	22,000	242,300	50,200
5a-7	106,300	422,400	47,800	9,900	586,400	58,600	645,000	272,000
5a-8	136,900	261,200	35,900	7,600	441,600	44,200	485,800	113,700
5a-9	40,300	115,000	14,900	3,200	173,400	17,300	190,700	90,100
5a-10	57,300	483,200	47,600	9,900	598,000	59,800	657,800	343,200
Total	480,800	2,003,600	209,200	43,800	2,737,400	273,700	3,011,100	1,196,700

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3 With PL-566 assistance.

Appendix table VI-23 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, environmental plan, short range (10-15 years)

Watershed	Crops and pasture: Irrigated	Crops and pasture: Non-irrigated	Other agri.	Roads & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
L'Anguille River											
Estimated average annual damages 2/											
5b-2	-	128,500	-	-	-	-	-	128,500	12,900	141,400	-
Total	-	128,500	-	-	-	-	-	128,500	12,900	141,400	-
Basin total	1,278,900	8,930,500	561,100	103,600	-	4,500	2,500	10,881,100	1,088,000	11,969,100	-
Estimated average annual benefits 3/											
5b-2	-	88,700	-	-	-	-	-	88,700	8,900	97,600	59,900
Total	-	88,700	-	-	-	-	-	88,700	8,900	97,600	59,900
Basin total	709,900	4,352,300	418,900	87,700	-	2,400	1,300	5,572,500	557,100	6,129,600	2,872,100

1/ Current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VI-24--Comparison of benefits and costs for structural measures
St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-7	524,700	286,200	810,900	314,000	2.58:1
5-8	61,500	28,700	90,200	69,300	1.30:1
5-11a	82,700	59,900	142,600	44,700	3.19:1
5-13	339,700	229,500	569,200	367,200	1.55:1
5-14	162,000	120,000	282,000	59,200	4.76:1
5-19	932,900	426,200	1,359,100	292,800	4.67:1
5-26	301,800	64,800	366,600	92,100	3.98:1
5-27	313,900	260,000	573,900	69,400	8.26:1
5-33	170,500	57,000	227,500	94,100	2.41:1
5-33a	131,200	83,200	214,400	66,300	3.23:1
Subtotal	3,020,900	1,615,500	4,636,400	1,469,100	
Little River System					
5a-1	366,200	226,000	592,200	373,900	1.41:1
5a-5	423,300	101,500	524,800	341,100	1.53:1
5a-6	242,300	50,200	292,500	185,800	1.57:1
5a-7	645,000	272,000	917,000	272,400	3.36:1
5a-8	485,800	113,700	599,500	388,100	1.54:1
5a-9	190,700	90,100	280,800	135,800	2.06:1
5a-10	657,800	343,200	1,001,000	305,900	3.27:1
Subtotal	3,011,100	1,196,700	4,207,800	2,003,000	
L'Anguille River					
5b-2	97,600	59,900	157,500	70,500	2.23:1
Subtotal	97,600	59,900	157,500	70,500	
Total	6,129,600	2,872,100	9,001,700	3,542,600	

1/ Current normalized prices.
2/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.

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Appendix table VI-24a--Comparison of benefits and costs for structural measures St. Francis River Basin, environmental plan, short range (10 - 15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-7	524,700	286,200	810,900	272,300	2.98:1
5-8	61,500	28,700	90,200	61,600	1.46:1
5-11a	82,700	59,900	142,600	39,800	3.58:1
5-13	339,700	229,500	569,200	317,600	1.79:1
5-14	162,000	120,000	282,000	52,500	5.37:1
5-19	932,900	426,200	1,359,100	267,400	5.08:1
5-26	301,800	64,800	366,600	82,900	4.42:1
5-27	313,900	260,000	573,900	63,900	8.98:1
5-33	170,500	57,000	227,500	83,500	2.72:1
5-33a	131,200	83,200	214,400	58,100	3.69:1
Subtotal	3,020,900	1,615,500	4,636,400	1,299,600	
Little River System					
5a-1	366,200	226,000	592,200	327,900	1.81:1
5a-5	423,300	101,500	524,800	295,500	1.78:1
5a-6	242,300	50,200	292,500	163,800	1.79:1
5a-7	645,000	272,000	917,000	241,700	3.79:1
5a-8	485,800	113,700	599,500	342,700	1.75:1
5a-9	190,700	90,100	280,800	121,100	2.32:1
5a-10	657,800	343,200	1,001,000	273,200	3.66:1
Subtotal	3,011,100	1,196,700	4,207,800	1,765,900	
L'Anguille River					
5b-2	97,600	59,900	157,500	61,100	2.58:1
Subtotal	97,600	59,900	157,500	61,100	
Total	6,129,600	2,872,100	9,001,700	3,126,600	

1/ Current normalized prices.
2/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.

Appendix table VI-25--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, environmental plan, long range

CNI Wshd. no.	Watershed area	Corps of Eng. 100 yr. flood	Percent of watershed		Wet soils 1/ needing drainage	Benefited wet soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
					St. Francis River Below Wappapello				
5-9	19,840	6,554	33.03	66.97	8,200	2,708	5,492	200	5,692
5-10	70,144	29,786	42.46	57.54	16,940	7,193	9,747	-	9,747
5-11	69,120	22,271	32.22	67.78	41,096	13,241	27,855	-	27,855
5-12	66,816	33,223	49.72	50.28	35,116	17,460	17,656	-	17,656
5-15	206,080	143,777	69.77	30.23	177,247	123,665	53,582	-	53,582
5-15a	30,720	-	-	100.00	21,500	-	21,500	-	21,500
5-15b	44,800	40,097	89.50	10.50	44,800	40,096	4,704	-	4,704
5-16	58,880	40,326	68.49	31.51	46,508	31,853	14,655	-	14,655
5-17	18,688	17,757	95.02	4.98	16,088	15,287	801	-	801
5-21	195,008	137,547	70.53	29.47	68,797	48,523	20,274	-	20,274
5-25	104,320	83,746	80.28	19.72	64,646	51,898	12,748	-	12,748
5-29	51,840	22,340	43.09	56.91	12,725	5,483	7,242	-	7,242
5-31	75,520	56,136	74.33	25.67	50,861	37,805	13,056	-	13,056
Subtotal	1,011,776	633,560			604,524	395,212	209,312	200	209,512
					Little River System				
5a-11	126,080	62,506	47.64	52.36	117,900	56,168	61,732	-	61,732
5a-12	83,200	74,467	89.50	10.50	59,887	53,599	6,288	-	6,288
Subtotal	209,280	136,973			177,787	109,767	68,020	-	68,020
Total	1,221,056	770,533			782,311	504,979	277,332	200	277,532

1/ Data source: Hydrologist data

Appendix table VI-26--Structure data - multiple purpose channels
St. Francis River Basin, environmental plan, long range

Watershed Number	Channel Improvement	Total Drainage Area	Drainage Area Controlled By Structures	Grade Stabilization Structures	Weirs for Habitat Enhancement	Channel Excavation
	(Miles)	(Sq. Mi.)	(Sq. Mi.)	(Number)	(Number)	(Cu. Yd.)
			St. Francis River Below Wappapello			
5-9	17	31.0	-	95	-	170,000
5-10	19	109.6	28.2	5	2	355,500
5-11	81	108.0	-	527	5	391,400
5-12	50	104.4	-	203	2	137,400
5-15	256	322.0	-	2,053	4	500,800
5-15a	35	48.0	-	280	2	500,000
5-15b	72	70.0	-	578	4	241,000
5-16	38	92.0	-	146	-	90,000
5-17	38	29.2	-	140	-	365,500
5-21	225	304.7	-	922	10	663,500
5-25	76	163.0	-	312	1	170,000
5-29	94	81.0	-	378	2	490,000
5-31	128	118.0	-	486	4	270,600
Subtotal	1,129	1,580.9	28.2	6,125	36	4,345,700
			Little River System			
5a-11	225	197.0	-	1,636	3	2,265,000
5a-12	46	130.0	-	188	4	388,900
Subtotal	271	327.0	-	1,824	7	2,653,900
Total	1,400	1,907.9	28.2	7,949	43	6,999,600

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Appendix table VI-27--Summary estimated structure cost distribution
St. Francis River Basin, environmental plan, long range

Item	Installation Cost - P. L. 566 Funds: Construction	Engineering	Project admin.	Total P. L. 566	Installation Cost - Other Funds: Construction	Project admin.	Land, Easements & R/W	Total Nonfederal	Total Installation Cost
	Dollars 1/								
St. Francis River Below Wappapello									
5-9	3,726,400	465,100	481,000	4,672,500	40,600	1,400	74,000	116,000	4,788,500
5-10	2,088,300	328,800	213,200	2,630,300	-	5,600	327,600	333,200	2,963,500
5-11	609,000	72,500	152,300	833,800	203,000	7,300	94,000	304,300	1,138,100
5-12	225,900	26,900	56,300	309.100	75,400	2,500	45,000	122,900	432,000
5-15	1,696,000	209,700	412,200	2,317,900	555,100	19,600	95,000	669,700	2,987,600
5-15a	254,500	31,500	54,000	340,000	54,700	2,000	38,300	95,000	435,000
5-15b	568,000	67,800	138,000	773,800	178,700	6,400	84,000	269,100	1,042,900
5-16	139,500	16,600	34,800	190,900	46,500	1,600	30,000	78,100	269,000
5-17	813,100	157,700	92,700	1,063,500	191,700	4,200	59,200	255,100	1,318,600
5-21	1,070,600	127,600	264,900	1,463,100	349,800	12,400	110,500	472,700	1,935,800
5-25	2,000,200	248,100	289,800	2,538,100	106,600	4,400	43,500	154,500	2,692,600
5-29	503,300	60,100	121,800	685,200	157,100	5,700	58,000	220,800	906,000
5-31	590,800	70,800	137,600	799,200	170,200	6,000	52,000	228,200	1,027,400
Subtotal	14,285,600	1,883,200	2,448,600	18,617,400	2,129,400	79,100	1,111,100	3,319,600	21,937,000
Little River System									
5a-11	1,918,600	228,500	477,600	2,624,700	634,300	22,600	137,500	794,400	3,419,100
5a-12	243,200	29,100	56,800	329,100	70,200	2,600	27,000	99,800	428,900
Subtotal	2,161,800	257,600	534,400	2,953,800	704,500	25,200	164,500	894,200	3,848,000
Total	16,447,400	2,140,800	2,983,000	21,571,200	2,833,900	104,300	1,275,600	4,213,800	25,785,000

1/ Price Base: 1970.

Appendix table VI-28--Total installation and annual costs
St. Francis River Basin, environmental plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
		St. Francis River Below Wappapello Reservoir		
5-9	4,788,500	329,600	42,600	372,200
5-10	2,963,500	204,000	11,900	215,900
5-11	1,138,100	78,300	24,100	102,400
5-12	432,000	29,700	15,100	44,800
5-15	2,987,600	205,600	76,900	282,500
5-15a	435,000	29,900	14,500	44,400
5-15b	1,042,900	71,800	22,400	94,200
5-16	269,000	18,500	13,800	32,300
5-17	1,318,600	90,800	13,600	104,400
5-21	1,935,800	133,200	68,300	201,500
5-25	2,692,600	185,300	103,400	288,700
5-29	906,000	62,400	29,400	91,800
5-31	1,027,400	70,700	33,200	103,900
Subtotal	21,937,000	1,509,800	469,200	1,979,000
		Little River System		
5a-11	3,419,100	235,300	67,400	302,700
5a-12	428,900	29,500	14,900	44,400
Subtotal	3,848,000	264,800	82,300	347,100
Total	25,785,000	1,774,600	551,500	2,326,100

1/ Price Base: 1970. Instllation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-28a--Total installation and annual costs
St. Francis River Basin, environmental plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	dollars			
		St. Francis River Below Wappapello Reservoir		
5-9	4,788,500	282,300	42,600	324,900
5-10	2,963,500	174,700	11,900	186,600
5-11	1,138,100	67,100	24,100	91,200
5-12	432,000	25,500	15,100	40,600
5-15	2,987,600	176,100	76,900	253,000
5-15a	435,000	25,600	14,500	40,100
5-15b	1,042,900	61,500	22,400	83,900
5-16	269,000	15,900	13,800	29,700
5-17	1,318,600	77,700	13,600	91,300
5-21	1,935,800	114,100	68,300	182,400
5-25	2,692,600	158,700	103,400	262,100
5-29	906,000	53,400	29,400	82,800
5-31	1,027,400	60,600	33,200	93,800
Subtotal	21,937,000	1,293,200	469,200	1,762,400
		Little River System		
5a-11	3,419,100	201,600	67,400	269,000
5a-12	428,900	25,300	14,900	40,200
Subtotal	3,848,000	226,900	82,300	309,200
Total	25,785,000	1,520,100	551,500	2,071,600

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VI-29--Estimated annual damages and benefits
St. Francis River Basin, environmental plan, long range

Watersheds	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Urban	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	Dollars 1/										
St. Francis River Basin Below Wappapello Reservoir											
Estimated Average Annual Damages 2/											
5-9	-	59,300	4,100	600	-	600	600	65,700	6,600	72,300	
5-10	-	323,400	7,200	11,300	2,900	31,700	9,800	386,300	38,600	424,900	
5-11	45,300	293,200	19,900	3,700				362,100	36,200	398,300	
5-12	17,600	255,000	15,600	2,900				291,100	29,100	320,200	
5-15	27,600	811,300	58,700	11,000				908,600	90,900	999,500	
5-15a	11,300	105,200	18,900	3,500				138,900	13,900	152,800	
5-15b	42,900	158,500	12,200	2,400				216,000	21,600	237,600	
5-16	25,100	394,700	23,100	4,300				447,200	44,700	491,900	
5-17	-	106,800	-	3,100				109,400	10,900	120,300	
5-21	162,500	345,000	25,500	4,700				537,700	53,800	591,500	
5-25	17,400	285,000	15,700	2,900				321,000	32,100	353,100	
5-29	18,800	122,800	7,400	1,200				150,200	15,000	165,200	
5-31	37,800	256,500	15,000	2,700				312,000	31,200	343,200	
Total	406,300	3,516,700	223,300	54,300	2,900	32,300	10,400	4,246,200	424,600	4,670,800	
Estimated Average Annual Benefits 3/											
5-9	-	30,300	3,200	600		300	300	34,700	3,500	38,200	26,000
5-10	-	180,100	6,000	9,300	2,500	20,400	6,700	225,000	22,500	247,500	15,000 4/
5-11	6,200	171,500	17,300	3,500				198,500	19,900	218,400	142,500
5-12	9,900	135,900	12,600	2,600				161,000	16,100	177,100	102,000
5-15	15,600	421,700	47,100	9,800				494,200	49,400	543,600	211,800
5-15a	9,500	55,100	15,100	3,200				82,900	8,300	91,200	64,400
5-15b	23,600	83,300	9,800	2,000				118,700	11,900	130,600	21,500
5-16	14,300	211,300	18,500	3,800				247,900	24,800	272,700	88,400
5-17	-	96,800	-	1,800				98,600	9,900	108,500	70,400
5-21	91,200	175,700	20,400	4,200				291,500	29,200	320,700	121,400
5-25	9,900	153,800	12,700	2,600				179,000	17,900	196,900	58,500
5-29	10,700	66,000	6,000	1,200				83,900	8,400	92,300	49,600
5-31	21,600	138,100	12,100	2,500				174,300	17,400	191,700	72,700
Total	212,500	1,919,600	180,800	47,100	2,500	20,700	7,000	2,390,200	239,200	2,629,400	1,029,200
											15,000 4/

1/ 1974 current normalized prices. 2/ Without additional federal assistance. 3/ With PL-566 assistance.
4/ Incidental recreation.

Appendix table VI-29 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, environmental plan, long range

Watershed	Crops and pasture: Irrigated	Crops and pasture: Non-irrigated	Other agri.	Road & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
Little River System											
Estimated average annual damages 2/											
5a-11	91,200	634,500	41,000	7,600	-	-	-	774,300	77,400	851,700	-
5a-12	6,800	161,000	9,300	1,800	-	-	-	178,900	17,900	196,800	-
Total	98,000	795,500	50,300	9,400	-	-	-	953,200	95,300	1,048,500	-
Basin total	504,300	4,312,200	273,600	63,700	2,900	32,300	10,400	5,199,400	519,900	5,719,300	-
Estimated average annual benefits 3/											
5a-11	47,100	335,700	32,800	6,800	-	-	-	422,400	42,200	464,600	238,700
5a-12	3,700	86,100	7,400	1,600	-	-	-	98,800	9,900	108,700	32,100
Total	50,800	421,800	40,200	8,400	-	-	-	521,200	52,100	573,300	270,800
Basin total	263,300	2,341,400	221,000	55,500	2,500	20,700	7,000	2,911,400	291,300	3,202,700	1,300,000 15,000 4/

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.
4/ Incidental recreation.

Appendix table VI-30--Comparison of benefits and costs for structural measures
St. Francis River Basin, environmental plan, long range

Watersheds	Average Annual Benefits [1]			Average Annual Cost [2]	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-9	38,200	26,000	64,200	372,200	0.17:1
5-10	247,500	15,000 [3]	262,500	215,900	1.21:1
5-11	218,400	142,500	360,900	102,400	3.52:1
5-12	177,100	102,000	279,100	44,800	6.22:1
5-15	543,600	211,800	755,400	282,500	2.67:1
5-15a	91,200	64,400	155,600	44,400	3.50:1
5-15b	130,600	21,500	152,100	94,200	1.61:1
5-16	272,700	88,400	361,100	32,300	11.17:1
5-17	108,500	70,400	178,900	104,400	1.71:1
5-21	320,700	121,400	442,100	201,500	2.19:1
5-25	196,900	58,500	255,400	288,700	0.88:1
5-29	92,300	49,600	141,900	91,800	1.54:1
5-31	191,700	72,700	264,400	103,900	2.54:1
Subtotal	2,629,400	1,029,200 15,000 [3]	3,658,600 15,000 [3]	1,979,000	
Little River System					
5a-11	464,600	238,700	703,300	302,700	2.32:1
5a-12	108,700	32,100	140,800	44,400	3.17:1
Subtotal	573,300	270,800	844,100	347,100	
Total	3,202,700	1,315,000	4,517,700	2,326,100	

1/ 1974 current normalized prices.
2/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.
3/ Incidental recreation.

Appendix table VI-30a--Comparison of benefits and costs for structural measures
St. Francis River Basin, environmental plan, long range

Watersheds	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-9	38,200	26,000	64,200	324,900	0.20:1
5-10	247,500	15,000 3/	262,500	186,600	1.41:1
5-11	218,400	142,500	360,900	91,200	3.96:1
5-12	177,100	102,000	279,100	40,600	6.87:1
5-15	543,600	211,800	755,400	253,000	2.99:1
5-15a	91,200	64,400	155,600	40,100	3.88:1
5-15b	130,600	21,500	152,100	83,900	1.81:1
5-16	272,700	88,400	361,100	29,700	12.16:1
5-17	108,500	70,400	178,900	91,300	1.96:1
5-21	320,700	121,400	442,100	182,400	2.42:1
5-25	196,900	58,500	255,400	262,100	0.97:1
5-29	92,300	49,600	141,900	82,800	1.71:1
5-31	191,700	72,700	264,400	93,800	2.82:1
Subtotal	2,629,400	1,029,200 15,000 3/	3,658,600 15,000 3/	1,762,400	
Little River System					
5a-11	464,600	238,700	703,300	269,000	2.61:1
5a-12	108,700	32,100	140,800	40,200	3.50:1
Subtotal	573,300	270,800	844,100	309,200	
Total	3,202,700	1,315,000	4,517,700	2,071,600	

1/ 1974 current normalized prices.
2/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.
3/ Incidental recreation.

Appendix table VI-31--Distribution or wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, environmental plan, not feasible for PL-566

CNI Watershed Number	Watershed Area	Corps of Eng. 100 Yr. Flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils 1/: Needing Drainage	Benefited Wet Soils: Corps	Benefited Wet Soils: SCS	Other SCS Benefited Flood Plain	Total SCS Benefited Area
	ACRES								
				St. Francis River Above Wappapello					
5-1	223,360	-	-	100.00	-	-	-	-	-
5-2	88,960	-	-	100.00	-	-	-	-	-
5-3	173,440	-	-	100.00	-	-	-	-	-
5-4	126,080	-	-	100.00	-	-	-	-	-
5-5	195,840	-	-	100.00	-	-	-	-	-
5-5a	30,720	-	-	100.00	-	-	-	-	-
Subtotal	838,400	-	-		-	-	-	-	-
				St. Francis River Below Wappapello					
5-20 2/	80,640	53,730	66.63	33.37	80,570	-	-	-	-
5-23 2/	119,040	49,285	41.40	58.60	39,338	-	-	-	-
5-24	87,040	77,903	89.50	10.50	64,097	57,367	0	-	0
5-28	90,880	81,111	89.25	10.75	59,219	52,853	0	-	0
5-30	66,560	59,573	89.50	10.50	36,518	32,684	0	-	0
5-32	49,280	43,534	88.34	11.66	32,402	28,624	0	-	0
5-34	94,080	83,631	88.89	11.11	48,365	42,992	0	-	0
5-35	27,520	13,037	47.37	52.63	9,849	4,665	0	-	0
5-35a	16,000	1,053	6.58	93.42	5,106	336	0	-	0
Subtotal	631,040	462,857			375,464	219,521	0	-	0

1/ Data Source: Hydrologist Data.
2/ Floodway.

Appendix table VI-31 (cont.)--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, Arkansas and Missouri, environmental plan, not feasible for PL-566

CNI Watershed Number	Watershed Area	Corps of Eng. 100 Yr. Flood	Percent of Watershed: Corps	Percent of Watershed: SCS	Wet Soils 1/: Needing Drainage	Benefited Wet Soils: Corps	Benefited Wet Soils: SCS	Other SCS Benefited Flood Plain	Total SCS Benefited Area
	ACRES								
				Little River System					
5a-0 2/	8,960	8,960	100.00	-	-	-	-	-	-
5a-3	9,600	343	3.57	96.43	2,570	92	0	-	0
5a-11a 3/	24,960	22,340	89.50	10.50	23,050	-	-	-	-
Subtotal	43,520	31,643			25,620	92	0	-	0
				L'Anguille River					
5b-1	23,680	13,275	56.06	43.94	16,567	9,287	0	-	0
5b-3	44,160	10,418	23.59	76.41	27,261	6,431	0	-	0
5b-4	31,360	2,876	9.17	90.83	27,251	2,499	0	-	0
5b-5	56,320	8,732	15.50	84.50	35,504	5,503	0	0	0
5b-6	42,240	3,514	8.32	91.68	41,700	3,469	0	-	0
5b-7	56,960	1,827	3.21	96.79	46,471	1,492	0	-	0
5b-9	73,600	11,466	15.58	84.42	54,962	8,563	0	0	0
5b-10	71,680	13,151	18.35	81.65	61,690	11,320	0	-	0
5b-11	57,600	31,214	54.19	45.81	31,542	17,093	0	-	0
5b-12	67,200	12,698	18.90	81.10	27,075	5,117	0	0	0
Subtotal	524,800	109,171			370,023	70,774	0	0	0
Total	2,037,760	603,671			771,107	290,387	0	0	0

1/ Data Source: Hydrologist Data.
2/ Floodway.
3/ Wildlife.

Appendix table VI-32--Structure data - multiple-purpose channels
St. Francis River Basin, environmental plan, not feasible for PL-566

Watershed Number	Channel Improvement (Miles)	Total Drainage Area (Sq. Mi.)	Drainage Area Controlled By Structures (Sq. Mi.)	Grade Stabilization Structures (Number)	Weirs for Habitat Enhancement (Number)	Channel Excavation (Cu. Yd.)
			St. Francis River Above Wappapello			
5-1	-	349.0	-	-	-	-
5-2	-	139.0	-	-	-	-
5-3	-	271.0	-	-	-	-
5-4	-	197.0	-	-	-	-
5-5	-	306.0	-	-	-	-
5-5a	-	48.0	-	-	-	-
Subtotal	-	1,310.0	-	-	-	-
			St. Francis River Below Wappapello			
5-20	-	126.0	-	-	-	-
5-23	-	186.0	-	-	-	-
5-24	-	136.0	-	-	-	-
5-28	-	142.0	-	-	-	-
5-30	-	104.0	-	-	-	-
5-32	-	77.0	-	-	-	-
5-34	-	147.0	-	-	-	-
5-35	-	43.0	-	-	-	-
5-35a	-	25.0	-	-	-	-
Subtotal	-	986.0	-	-	-	-
			Little River System			
5a-0	-	14.0	-	-	-	-
5a-3	-	15.0	-	-	-	-
5a-11a	-	39.0	-	-	-	-
Subtotal	-	68.0	-	-	-	-
			L'Anguille River			
5b-1	-	37.0	-	-	-	-
5b-3	-	69.0	-	-	-	-
5b-4	-	49.0	-	-	-	-
5b-5	-	88.0	-	-	-	-
5b-6	-	66.0	-	-	-	-
5b-7	-	89.0	-	-	-	-
5b-9	-	115.0	-	-	-	-
5b-10	-	112.0	-	-	-	-
5b-11	-	90.0	-	-	-	-
5b-12	-	105.0	-	-	-	-
Subtotal	-	820.0	-	-	-	-
Total	-	3,184.0	-	-	-	-

Appendix table VI-33--Present and projected forest land under the baseline projection and alternatives, St. Francis River Basin, year 2000

	Alternatives		
	Baseline projection	(B) Economic	(C) Environmental
	acres		
Present forest - 1969	985,000	985,000	985,000
Clearing for:	111,600	116,000	116,000
Crops	100,400	104,400	104,400
Pasture	6,200	6,200	6,200
Urban	5,000	5,000	5,000
Floodwater retarding structures	0	400	400
Planting	0	3,900	6,200
Projected forest - 2000	873,400	872,900	875,200
Noncommercial	37,200	37,200	37,200
Commercial	836,200	835,700	838,000
Wildlife development	65,500	66,200	152,500
Recreation development	4,800	4,900	18,100
Timber production 1/	831,400	830,800	819,900

1/ Commercial forest minus recreation development.

Appendix table VI-34--Forest management practices under the baseline projection and alternatives, St. Francis River Basin, year 2000

	Unit	Quantities needed 1/	Alternatives					
			Baseline projection		(B) Economic		(C) Environmental	
			provides	remaining	provides	remaining	provides	remaining
Forest management plans	acres	691,000	150,000	541,000	271,200	419,800	271,200	419,800
Critical area stabilization								
Tree planting	acres	13,200	0	13,200	13,200	0	13,200	0
Logging roads and skid trails	acres	2/	118,300	0	117,200	0	112,600	0
Grazing removals	acres	78,800	15,700	63,100	29,800	49,000	43,800	35,000
Tree planting	acres	51,600	15,700	35,900	23,700	27,900	22,100	29,500
Timber stand improvement	acres	373,100	95,900	277,200	160,200	212,900	122,100	251,000

1/ See table IV-8.
2/ Total acres needing stabilization will vary under each alternative.

Appendix table VI-35--Annual timber growth and product yield under the baseline projection and alternatives, St. Francis River Basin, years 1980, 2000, and 2020

Year	Baseline projection 1/		Alternatives (B) Economic 2/		(C) Environmental 2/	
	Annual growth	Product 3/ yield	Annual growth	Product 3/ yield	Annual growth	Product 3/ yield
	- - - - - - - - - - - - - - Cubic feet per acre - - - - - - - - - - - - - -					
1980	36.8	24.2	36.8	24.2	32.9	21.4
2000	42.8	36.4	47.1	40.0	40.6	34.5
2020	49.2	46.7	55.8	53.0	47.1	44.7

1/ Current level of management.
2/ High level of management.
3/ Product yield - the growth available for products is a percentage of the net annual growth: 1980 - 66 percent; 2000 - 85 percent; 2020 - 95 percent.

Appendix table VI-36--Timber product needs and supply under the baseline projection and alternatives, St. Francis River Basin, year 2000

Plan	Needs 1/	Supply 2/	Unsatisfied needs
	- - - - - - - - Million cubic feet - - - - - - - -		
Baseline projection	35	28	7
Economic alternative (B)	35	31	4
Environmental alternative (C)	35	24	11

1/ OBERS table IV-2.
2/ Includes saw and veneer logs, miscellaneous wood products, pulpwood and fuelwood.

Appendix table VI-37--Estimated average annual gross erosion and sediment yield from forest land by conditions under the baseline projection and alternatives, St. Francis River Basin, year 2000

Forest conditions and problems	Alternatives		
	Baseline projection	(B) Economic	(C) Environmental
	Tons per year		
Gross erosion			
Undisturbed	288,800	294,800	308,800
Disturbed 1/	663,900	536,300	428,300
Total	952,700	831,100	737,100
Sediment yield			
Undisturbed	2,000	2,000	2,100
Disturbed 1/	74,100	60,300	45,000
Total	76,100	62,300	47,100

1/ Includes logging areas, skid trails, logging roads, fire, and grazing. Treatment of skid trails, logging roads, and grazing expected to be done under the Federal Water Pollution Control Act Amendments of 1972.

Appendix table VI-38--Estimated forest practices cost under the baseline projection and alternatives, St. Francis River Basin, year 2000

Practices	Alternatives		
	Baseline projection	(B) Economic	(C) Environmental
	Million dollars 1/		
Tree planting			
Critical	-	5.5	5.5
Inter and other	0.6	1.0	0.9
Timber stand improvement	2.7	4.0	2.5
Grazing exclusion 2/	1.7	3.4	4.9
Logging roads and skid trails 2/	9.7	9.5	9.3
Technical assistance	0.6	1.2	1.1
Total	15.3	24.6	24.2

1/ Price Base: 1970.
2/ Treatment under the Federal Water Pollution Control Act Amendments of 1972.

Appendix table VI-39--Additional forest land needed to satisfy timber production needs under the baseline projection and alternatives, St. Francis River Basin, year 2000

Plan	Additional forest land
	Acres
Baseline projection	192,000
Economic alternative (B)	100,000
Environmental alternative (C)	319,000

Appendix table VI-40--Forest employment and income under the baseline projection and alternatives, St. Francis River Basin, year 2000

Forest employment	Unit	Alternatives		
		Baseline projection	(B) Economic	(C) Environmental
Land treatment practices and technical assistance				
a. Number	man-years	734	926	975
b. Income	million dollars	6.4	7.2	7.1
Forest management, protection, and industries				
a. Number	man-years	1,000	1,135	880
b. Income	million dollars	6.4	7.3	5.6
Total				
a. Number	man-years	1,734	2,061	1,855
b. Income	million dollars	12.8	14.5	12.7

APPENDIX TABLES - CHAPTER VII

Recommended Plan

Appendix table VII-1--Distribution of wet soils and other benefited flood plain by watersheds
St. Francis River Basin, recommended plan, short range (10-15 years)

CNI Watershed No.	Watershed area	Corps of Eng. 100 Yr. flood	Percent of Watershed		Wet Soils 1/ Needing Drainage	Benefited Wet Soils		Other SCS benefited flood plain	Total SCS benefited area
			Corps	SCS		Corps	SCS		
	Acres								
St. Francis River Below Wappapello									
5-7	216,960	84,548	38.97	61.03	96,300	37,528	58,772	4,073	62,845
5-8	58,880	7,859	13.35	86.65	19,800	2,643	17,157	-	17,157
5-11a	26,880	5,728	21.31	78.69	15,200	3,239	11,961	-	11,961
5-13	136,960	24,173	17.65	82.35	47,065	8,307	38,758	4,500	43,258
5-14	49,920	9,347	18.72	81.28	21,193	3,967	17,226	35	17,261
5-26	62,720	51,209	81.65	18.35	48,127	39,296	8,831	-	8,831
5-27	62,720	-	-	100.00	41,030	-	41,030	-	41,030
5-33a	36,224	20,851	57.56	42.44	23,307	13,416	9,891	-	9,891
Subtotal	651,264	203,715			312,022	108,396	203,626	8,608	212,234
Little River System									
5a-1	150,400	59,229	39.38	60.62	105,800	41,664	64,136	2,562	66,698
5a-5	118,400	-	-	100.00	33,828	-	33,828	6,142	39,970
5a-6	85,120	72,175	84.16	15.84	59,300	49,907	9,393	60	9,453
5a-7	195,200	120,864	61.92	38.08	131,300	81,301	49,999	120	50,119
5a-8	184,960	154,374	82.61	17.39	104,200	86,080	18,120	200	18,320
5a-9	129,280	79,049	60.55	39.45	47,800	28,943	18,857	-	18,857
5a-10	197,120	103,108	52.31	47.69	112,340	58,765	53,575	-	53,575
Subtotal	1,060,480	588,799			594,568	346,660	247,908	9,084	256,992
L'Anguille River									
5b-2	35,840	8,137	22.70	77.30	23,591	5,355	18,236	-	18,236
Subtotal	35,840	8,137			23,591	5,355	18,236	-	18,236
Total	1,747,584	800,651			930,181	460,411	469,770	17,692	487,462

1/ Data Source: Hydrologist data.

Appendix table VII-2--Structure data - multiple-purpose channels
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed Number	Channel Improvement (Miles)	Total Drainage Area (Sq. Mi.)	Drainage Area Controlled By Structures (Sq. Mi.)	Grade Stabilization Structures (Number)	Weirs for Habitat Enhancement (Number)	Channel Excavation (Cu. Yds.)
			St. Francis River Below Wappapello			
5-7	58	339.0	12.7	491	4	377,600
5-8	45	92.0	-	243	3	162,500
5-11a	36	42.0	-	292	-	196,100
5-13	51	214.0	28.8	210	1	225,200
5-14	37	78.0	1.7	150	4	220,000
5-26	89	98.0	-	355	9	536,200
5-27	67	98.0	-	267	2	207,500
5-33a	35	56.6	-	152	2	754,600
Subtotal	418	1,017.6	43.2	2,160	25	2,679,700
			Little River System			
5a-1	153	235.0	11.1	1,224	11	367,800
5a-5	50	185.0	13.8	422	1	390,800
5a-6	95	133.0	5.2	759	4	330,500
5a-7	188	305.0	1.2	1,504	6	1,482,400
5a-8	229	289.0	3.9	1,835	29	2,197,000
5a-9	105	202.8	-	849	6	226,200
5a-10	256	308.0	-	2,418	12	1,236,400
Subtotal	1,076	1,657.8	35.2	9,011	69	6,231,100
			L'Anguille River			
5b-2	48	56.0	-	200	-	938,100
Subtotal	48	56.0	-	200	-	938,100
Total	1,542	2,731.4	78.4	11,371	94	9,848,900

Appendix table VII-3--Summary estimated structure cost distribution 1/
St. Francis River Basin, recommended plan, short range (10-15 years)

Item	Installation Cost - P. L. 566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engineering	Project admin.	Total P. L. 566	Construction	Project admin.	Land, Easements & R/W	Total Nonfederal	
Below Wappapello Reservoir									
5-7	2,263,100	215,500	459,200	2,937,800	164,000	21,800	297,500	483,300	3,421,100
5-8	307,500	36,400	81,600	425,500	114,800	4,200	37,000	156,000	581,500
5-11a	264,800	31,400	67,700	363,900	92,200	3,400	20,000	115,600	479,500
5-13	3,167,900	290,600	611,100	4,069,600	83,600	29,200	576,000	688,800	4,758,400
5-14	377,600	39,800	83,500	500,900	68,100	3,900	72,000	144,000	644,900
5-26	396,600	46,600	110,600	553,800	160,300	5,900	62,000	228,200	782,000
5-27	143,400	16,800	41,200	201,400	62,000	2,300	35,000	99,300	300,700
5-33a	403,900	45,000	95,400	544,300	104,800	4,900	143,700	253,400	797,700
Subtotal	7,324,800	722,100	1,550,300	9,597,200	849,800	75,600	1,243,200	2,168,600	11,765,800
Little River System									
5a-1	2,683,700	268,900	580,400	3,533,000	364,800	28,300	248,000	641,100	4,174,100
5a-5	2,547,300	239,700	507,200	3,294,200	148,600	24,200	402,000	574,800	3,869,000
5a-6	1,212,700	125,900	274,500	1,613,100	226,900	13,600	85,000	325,500	1,938,600
5a-7	1,690,700	192,500	420,900	2,304,100	515,600	20,800	29,000	565,400	2,869,500
5a-8	2,418,900	269,800	603,600	3,292,300	712,300	30,100	58,500	800,900	4,093,200
5a-9	695,500	82,300	184,400	962,200	259,600	9,400	45,400	314,400	1,276,600
5a-10	1,602,400	189,500	426,100	2,218,000	602,600	21,400	208,000	832,000	3,050,000
Subtotal	12,851,200	1,368,600	2,997,100	17,216,900	2,830,400	147,800	1,075,900	4,054,100	21,271,000
L'Anguille River									
5b-2	447,000	100,100	50,000	597,100	109,000	2,500	136,500	248,000	845,100
Subtotal	447,000	100,100	50,000	597,100	109,000	2,500	136,500	248,000	845,100
Total	20,623,000	2,190,800	4,597,400	27,411,200	3,789,200	225,900	2,455,600	6,470,700	33,881,900

1/ Price Base: 1970.

Appendix table VII-4--Total installation and annual costs
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	Dollars			
	St. Francis River Below Wappapello Reservoir			
5-7	3,421,100	235,500	18,800	254,300
5-8	581,500	40,000	13,500	53,500
5-11a	479,500	33,000	10,400	43,400
5-13	4,758,400	327,500	20,000	347,500
5-14	644,900	44,400	11,400	55,800
5-26	782,000	53,800	23,000	76,800
5-27	300,700	20,700	17,000	37,700
5-33a	797,700	54,900	8,700	63,600
Subtotal	11,765,800	809,800	122,800	932,600
	Little River System			
5a-1	4,174,100	287,300	48,000	335,300
5a-5	3,869,000	266,300	20,100	286,400
5a-6	1,938,600	133,400	28,300	161,700
5a-7	2,869,500	197,500	54,200	251,700
5a-8	4,093,200	281,700	64,300	346,000
5a-9	1,276,600	87,900	29,200	117,100
5a-10	3,050,000	209,900	72,000	281,900
Subtotal	21,271,000	1,464,000	316,100	1,780,100
	L'Anguille River			
5b-2	845,100	58,200	4,800	63,000
Total	33,881,900	2,332,000	443,700	2,775,700

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VII-4a--Total installation and annual costs
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	Dollars			
	St. Francis River Below Wappapello Reservoir			
5-7	3,421,100	201,700	18,800	220,500
5-8	581,500	34,300	13,500	47,800
5-11a	479,500	28,300	10,400	38,700
5-13	4,758,400	208,500	20,000	228,500
5-14	644,900	38,000	11,400	49,400
5-26	782,000	46,100	23,000	69,100
5-27	300,700	17,700	17,000	34,700
5-33a	797,700	47,000	8,700	55,700
Subtotal	11,765,800	621,600	122,800	744,400
	Little River System			
5a-1	4,174,100	246,100	48,000	294,100
5a-5	3,869,000	228,100	20,100	248,200
5a-6	1,938,600	114,300	28,300	142,600
5a-7	2,869,500	169,200	54,200	223,400
5a-8	4,093,200	241,300	64,300	305,600
5a-9	1,276,600	75,300	29,200	104,500
5a-10	3,050,000	179,800	72,000	251,800
Subtotal	21,271,000	1,254,100	316,100	1,570,200
	L'Anguille River			
5b-2	845,100	49,800	4,800	54,600
Total	33,881,900	1,925,500	443,700	2,369,200

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VII-5--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed	Crop and Pasture: Irrigated	Crop and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
				St. Francis River below Wappapello Reservoir						
				Estimated average annual damages 2/						
	Dollars									
5-7	4,900	815,900	51,400	9,700	400	300	882,600	88,300	970,900	
5-8	10,100	51,900	24,400	4,500	-	-	90,900	9,100	100,000	
5-11a	30,000	97,200	8,400	1,600	-	-	137,200	13,700	150,900	
5-13	47,100	552,500	33,400	6,200	4,000	2,100	645,300	64,500	709,800	
5-14	123,000	126,100	12,200	2,300	100	100	263,800	26,400	290,200	
5-26	34,800	428,900	24,200	4,400	-	-	492,300	49,200	541,500	
5-27	53,700	429,500	25,900	4,900	-	-	514,000	51,400	565,400	
5-33a	-	235,900	-	-	-	-	235,900	23,600	259,500	
Total	303,600	2,737,900	179,900	33,600	4,500	2,500	3,262,000	326,200	3,588,200	
				Estimated average annual benefits 3/						
5-7	2,700	424,800	37,500	8,400	400	300	474,100	47,400	521,500	286,200
5-8	5,500	26,900	19,500	4,000	-	-	55,900	5,600	61,500	28,700
5-11a	16,600	50,500	6,700	1,400	-	-	75,200	7,500	82,700	59,900
5-13	26,400	284,800	25,500	5,200	1,900	1,000	344,800	34,400	379,200	229,500
5-14	69,000	66,500	9,600	2,000	100	100	147,300	14,700	162,000	120,000
5-26	20,000	231,000	19,400	4,000	-	-	274,400	27,400	301,800	64,800
5-27	30,500	230,000	20,600	4,300	-	-	285,400	28,500	313,900	260,000
5-33a	-	119,300	-	-	-	-	119,300	11,900	131,200	83,200
Total	170,700	1,433,800	138,800	29,300	2,400	1,400	1,776,400	177,400	1,953,800	1,132,300

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VII-5 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed	Crop and Pasture: Irrigated	Crop and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Subtotal	Indirect	Total	Drainage
				Little River System				
				Estimated average annual damages 2/				
	----------	----------	----------	Dollars	----------	----------	----------	----------
5a-1	133,300	494,900	34,600	6,400	669,200	66,900	736,100	
5a-5	14,000	1,141,800	46,800	8,700	1,211,300	121,100	1,332,400	
5a-6	120,400	366,300	26,600	4,700	518,000	51,800	569,800	
5a-7	192,700	930,900	59,800	11,100	1,194,500	119,500	1,314,000	
5a-8	248,700	498,900	44,900	8,200	800,700	80,100	880,800	
5a-9	73,400	220,500	18,700	3,500	316,100	31,600	347,700	
5a-10	102,800	903,100	59,500	11,000	1,076,400	107,600	1,184,000	
Total	885,300	4,556,400	290,900	53,600	5,786,200	578,600	6,364,800	
				Estimated average annual benefits 3/				
5a-1	73,200	228,800	25,600	5,300	332,900	33,300	366,200	226,000
5a-5	700	360,400	19,500	4,200	384,800	38,500	423,300	101,500
5a-6	66,100	132,600	17,900	3,700	220,300	22,000	242,300	50,200
5a-7	106,300	422,400	47,800	9,900	586,400	58,600	645,000	272,000
5a-8	136,900	261,200	35,900	7,600	441,600	44,200	485,800	113,700
5a-9	40,300	115,000	14,900	3,200	173,400	17,300	190,700	90,100
5a-10	57,300	483,200	47,600	9,900	598,000	59,800	657,800	342,200
Total	480,800	2,003,600	209,200	43,800	2,737,400	273,700	3,011,100	1,195,700

1/ 1973 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VII-5 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed	Crops and pasture: Irrigated	Crops and pasture: Non-irrigated	Other agri.	Road & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
L'Anguille River											
Estimated average annual damages 2/											
5b-2	-	128,500	-	-	-	-	-	128,500	12,900	141,400	-
Total	-	128,500	-	-	-	-	-	128,500	12,900	141,400	-
Basin total	1,188,900	7,422,800	470,800	87,200	-	4,500	2,500	9,176,700	917,700	10,094,400	
Estimated average annual benefits 3/											
5b-2	-	88,700	-	-	-	-	-	88,700	8,900	97,600	-
Total	-	88,700	-	-	-	-	-	88,700	8,900	97,600	59,900
Basin total	740,200	3,437,400	348,000	73,100	-	2,400	1,400	4,602,500	460,000	5,062,500	2,387,900

1/ 1974 current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.

Appendix table VII-6--Comparison of benefits and costs for structural measures
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-7	521,500	286,200	807,700	254,300	3.16:1
5-8	61,500	28,700	90,200	53,500	1,68:1
5-11a	82,700	59,900	142,600	43,400	3.28:1
5-13	379,200	229,500	608,700	347,500	1.75:1
5-14	162,000	120,000	282,000	55,800	5.05:1
5-26	301,800	64,800	366,600	76,800	4.77:1
5-27	313,900	260,000	573,900	37,700	15.22:1
5-33a	131,200	83,200	214,400	63,600	3.37:1
Subtotal	1,953,800	1,132,300	3,086,100	932,600	
Little River System					
5a-1	366,200	226,000	592,200	335,300	1.76:1
5a-5	423,300	101,500	524,800	286,400	1.83:1
5a-6	242,300	50,200	292,500	161,700	1.80:1
5a-7	645,000	272,000	917,000	251,700	3.64:1
5a-8	485,800	113,700	599,500	346,000	1.73:1
5a-9	190,700	90,100	280,800	117,100	2.39:1
5a-10	657,800	342,200	1,000,000	281,900	3.54:1
Subtotal	3,011,100	1,197,700	4,206,800	1,780,100	
L'Anguille River					
5b-2	97,600	59,900	157,500	63,000	2.50:1
Total	5,062,500	2,387,900	7,450,400	2,775,700	

1/ 1974 Current Normalized Prices.
2/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.

Appendix table VII-6a--Comparison of benefits and costs for structural measures
St. Francis River Basin, recommended plan, short range (10-15 years)

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit To Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-7	521,500	286,200	807,700	220,500	3.66:1
5-8	61,500	28,700	90,200	47,800	1.89:1
5-11a	82,700	59,900	142,600	38,700	3.68:1
5-13	379,200	229,500	608,700	228,500	2.66:1
5-14	162,000	120,000	282,000	49,400	5.70:1
5-26	301,800	64,800	366,600	69,100	5.31:1
5-27	313,900	260,000	573,900	34,700	16.54:1
5-33a	131,200	83,200	214,400	55,700	3.85:1
Subtotal	1,953,800	1,132,300	3,086,100	744,400	
Little River System					
5a-1	366,200	226,000	592,200	294,100	2.01:1
5a-5	423,300	101,500	524,800	248,200	2.11:1
5a-6	242,300	50,200	292,500	142,600	2.05:1
5a-7	645,000	272,000	917,000	223,400	4.10:1
5a-8	485,800	113,700	599,500	305,600	1.96:1
5a-9	190,700	90,100	280,800	104,500	2.69:1
5a-10	657,800	342,200	1,000,000	251,800	3.97:1
Subtotal	3,011,100	1,197,700	4,206,800	1,570,200	
L'Anguille River					
5b-2	97,600	59,900	157,500	54,600	2.88:1
Total	5,062,500	2,387,900	7,450,400	2,369,200	

1/ 1974 Current normalized prices.
2/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.

Appendix table VII-7--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, long range

Watersheds	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Urban	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	Dollars										
	Estimated Average Annual Damages 2/										
	St. Francis River Below Wappapello Reservoir										
5-9	-	59,800	4,100	600	-	600	600	65,700	6,600	72,300	
5-10	-	323,400	7,200	11,300	2,900	31,700	9,800	386,300	38,600	424,900	
5-11	45,300	293,200	19,900	3,700	-	-	-	362,100	36,200	398,300	
5-12	17,600	255,000	15,600	2,900	-	-	-	291,100	29,100	320,200	
5-15	27,100	811,300	58,700	11,000	-	-	-	908,100	90,800	998,900	
5-15a	10,800	105,200	18,900	3,500	-	-	-	138,400	13,800	152,200	
5-15b	41,200	158,500	12,200	2,400	-	-	-	214,300	21,400	235,700	
5-16	25,100	394,700	23,100	4,300	-	-	-	447,200	44,700	491,900	
5-17	-	106,300	-	3,100	-	-	-	109,400	10,900	120,300	
5-19	51,300	1,382,000	75,500	14,000	-	-	-	1,522,800	152,300	1,675,100	
5-21	162,500	330,200	25,500	4,700	-	-	-	522,900	52,300	575,200	
5-25	17,400	285,000	15,700	2,900	-	-	-	321,000	32,100	353,100	
5-29	18,800	122,800	7,400	1,200	-	-	-	150,200	15,000	165,200	
5-31	37,800	256,500	15,000	2,700	-	-	-	312,000	31,200	343,200	
5-33	51,300	210,900	12,800	2,400	-	-	-	277,400	27,700	305,100	
Total	506,200	5,094,800	311,600	70,700	2,900	32,300	10,400	6,028,900	602,700	6,631,600	

1/ 1974 current normalized prices.
2/ Without additional federal assistance.

Appendix table VII-7 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, long range

Watersheds	Crops and Pasture: Irrigated	Crops and Pasture: Non-Irrigated	Other Agri.	Roads & Bridges	Urban	Overbank Deposition	Flood-plain Scour	Subtotal	Indirect	Total	Drainage
	Dollars										
	Estimated Average Annual Benefits 2/										
	St. Francis River Below Wappapello Reservoir										
5-9	-	30,300	3,200	600	-	300	300	34,700	3,500	38,200	26,000
5-10	-	180,100	6,000	9,300	2,500	20,400	6,700	225,000	22,500	247,500	15,000 3/
5-11	6,200	171,500	17,300	3,500	-	-	-	198,500	19,900	218,400	142,500
5-12	9,900	135,900	12,600	2,600	-	-	-	161,000	16,100	177,100	102,000
5-15	15,000	421,700	47,100	9,800	-	-	-	493,600	49,400	543,000	211,800
5-15a	9,100	55,100	15,100	3,200	-	-	-	82,500	8,300	90,800	64,400
5-15b	22,600	83,300	9,800	2,000	-	-	-	117,700	11,800	129,500	21,500
5-16	14,300	211,300	18,500	3,800	-	-	-	247,900	24,800	272,700	88,400
5-17	-	96,800	-	1,800	-	-	-	98,600	9,900	108,500	70,400
5-19	29,300	745,800	60,500	12,500	-	-	-	848,100	84,800	932,900	426,200
5-21	91,200	175,700	20,400	4,200	-	-	-	291,500	29,200	320,700	121,400
5-25	9,900	153,800	12,700	2,600	-	-	-	179,000	17,900	196,900	58,500
5-29	10,700	66,000	6,000	1,200	-	-	-	83,900	8,400	92,300	49,600
5-31	21,600	138,100	12,100	2,500	-	-	-	174,300	17,400	191,700	72,700
5-33	29,100	113,400	10,400	2,100	-	-	-	155,000	15,500	170,500	57,000
Total	268,900	2,778,800	251,700	61,700	2,500	20,700	7,000	3,391,300	339,400	3,730,700	1,512,400 15,000 3/

1/ 1974 current normalized prices.
2/ With PL-566 assistance.
3/ Incidental recreation.

Appendix table VII-7 (cont.)--Estimated average annual damages and benefits 1/
St. Francis River Basin, recommended plan, long range

Watershed	Crops and pasture: Irrigated	Crops and pasture: Non-irrigated	Other agri.	Roads & bridges	Urban	Overbank deposition	Flood-plain scour	Subtotal	Indirect	Total	Drainage
	Dollars										
Little River System											
Estimated average annual damages 2/											
5a-11	91,200	634,500	41,000	7,600	-	-	-	774,300	77,400	851,700	-
5a-12	6,800	161,000	9,300	1,800	-	-	-	178,900	17,900	196,800	-
Total	98,000	795,500	50,300	9,400	-	-	-	953,200	95,300	1,048,500	-
Basin total	604,200	5,890,300	361,900	80,100	2,900	32,300	10,400	6,982,100	698,000	7,680,100	-
Estimated average annual benefits 3/											
5a-11	47,100	335,700	32,800	6,800	-	-	-	422,400	42,200	464,600	238,700
5a-12	3,800	86,100	7,400	1,600	-	-	-	98,900	9,900	108,800	32,100
Total	50,900	421,800	40,200	8,400	-	-	-	521,300	52,100	573,400	270,800
Basin total	319,800	3,200,600	291,900	70,100	2,500	20,700	7,000	3,912,600	391,500	4,304,100	1,783,200
											15,000 4/

1/ Current normalized prices.
2/ Without additional federal assistance.
3/ With PL-566 assistance.
4/ Incidental recreation.

Appendix table VII-8--Total installation and annual costs
St. Francis River Basin, recommended plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	Dollars			
	St. Francis River Below Wappapello Reservoir			
5-9	273,200	18,800	2,400	21,200
5-10	2,475,800	170,400	9,900	180,300
5-11	1,055,400	72,600	22,300	94,900
5-12	388,100	26,700	13,500	40,200
5-15	2,763,500	190,200	72,100	262,300
5-15a	315,000	21,700	10,500	32,200
5-15b	932,600	64,200	20,100	84,300
5-16	248,100	17,100	12,700	29,800
5-17	1,226,900	84,400	12,600	97,000
5-19	2,247,200	154,700	101,800	256,500
5-21	1,707,500	117,500	60,300	177,800
5-25	541,500	37,300	20,800	58,100
5-29	797,500	54,900	25,800	80,700
5-31	823,100	56,700	26,600	83,300
5-33	665,400	45,800	12,400	58,200
Subtotal	16,460,800	1,133,000	423,800	1,556,800
	Little River System			
5a-11	3,247,600	223,500	64,000	287,500
5a-12	333,900	23,000	11,600	34,600
Subtotal	3,581,500	246,500	75,600	322,100
Total	20,042,300	1,379,500	499,400	1,878,900

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 6-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VII-8a--Total installation and annual costs
St. Francis River Basin, recommended plan, long range

Watershed Number	Total Installation Cost	Amortization of Installation Cost 1/	Operation and Maintenance Cost 2/	Total
	Dollars			
	St. Francis River Below Wappapello Reservoir			
5-9	273,200	16,100	2,400	18,500
5-10	2,475,800	145,900	9,900	155,800
5-11	1,055,400	62,200	22,300	84,500
5-12	388,100	22,900	13,500	36,400
5-15	2,763,500	162,900	72,100	235,000
5-15a	315,000	18,600	10,500	29,100
5-15b	932,600	55,000	20,100	75,100
5-16	248,100	14,600	12,700	27,300
5-17	1,226,900	72,300	12,600	84,900
5-19	2,247,200	132,500	101,800	234,300
5-21	1,707,500	100,700	60,300	161,000
5-25	541,500	31,900	20,800	52,700
5-29	797,500	47,000	25,800	72,800
5-31	823,100	48,500	26,600	75,100
5-33	665,400	39,200	12,400	51,600
Subtotal	16,460,800	970,300	423,800	1,394,100
	Little River System			
5a-11	3,247,600	191,400	64,000	255,400
5a-12	333,900	19,700	11,600	31,300
Subtotal	3,581,500	211,100	75,600	286,700
Total	20,042,300	1,181,400	499,400	1,680,800

1/ Price Base: 1970. Installation costs amortized over a 100-year period at 5-7/8 percent interest.

2/ Long-term prices. Includes replacement cost of measures having less than 100-year life.

Appendix table VII-9--Comparison of benefits and costs for structural measures
St. Francis River Basin, recommended plan, long range

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit to Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-9	38,200	26,000	64,200	21,200	3.02:1
5-10	247,500	15,000 3/	262,500	180,300	1.45:1
5-11	218,400	142,500	360,900	94,900	3.80:1
5-12	177,100	102,000	279,100	40,200	6.94:1
5-15	653,000	211,800	864,800	262,300	3.29:1
5-15a	90,800	64,400	155,200	32,200	4.81:1
5-15b	129,500	21,500	151,000	84,300	1.79:1
5-16	272,700	88,400	361,100	29,800	12.11:1
5-17	108,500	70,400	178,900	97,000	1.84:1
5-19	932,900	426,200	1,359,100	256,500	5.29:1
5-21	320,700	121,400	442,100	177,800	2.37:1
5-25	196,900	58,500	255,400	58,100	4.39:1
5-29	92,300	49,600	141,900	80,700	1.75:1
5-31	191,700	72,700	264,400	83,300	3.17:1
5-33	170,500	57,000	227,500	58,200	3.90:1
Subtotal	3,840,700	1,512,400 15,000 3/	5,353,100 15,000 3/	1,556,800	
Little River System					
5a-11	464,600	238,700	703,300	287,500	2.44:1
5a-12	108,800	32,100	140,900	34,600	4.07:1
Subtotal	573,400	270,800	844,200	322,100	
Total	4,414,100	1,798,200	6,212,300	1,878,900	

1/ 1974 Current Normalized Prices.
2/ Average annual cost amortized over a 100-year period at 6-7/8 percent interest.
3/ Incidental recreation.

Appendix table VII-9a--Comparison of benefits and costs for structural measures
St. Francis River Basin, recommended plan, long range

Watershed	Average Annual Benefits 1/			Average Annual Cost 2/	Benefit to Cost Ratio
	Damage Reduction	Agricultural Water Management	Total		
	Dollars				
St. Francis River Below Wappapello Reservoir					
5-9	38,200	26,000	64,200	18,500	3.47:1
5-10	247,500	15,000 3/	262,500	155,800	1.68:1
5-11	218,400	142,500	360,900	84,500	4.27:1
5-12	177,100	102,000	279,100	36,400	7.67:1
5-15	653,000	211,800	864,800	235,000	3.68:1
5-15a	90,800	64,400	155,200	29,100	5.33:1
5-15b	129,500	21,500	151,000	75,100	2.01:1
5-16	272,700	88,400	361,100	27,300	13.23:1
5-17	108,500	70,400	178,900	84,900	2.10:1
5-19	932,900	426,200	1,359,100	234,300	5.80:1
5-21	320,700	121,400	442,100	161,000	2.75:1
5-25	196,900	58,500	255,400	52,700	4.85:1
5-29	92,300	49,600	141,900	72,800	1.95:1
5-31	191,700	72,700	264,400	75,100	3.52:1
5-33	170,500	57,000	227,500	51,600	4.41:1
Subtotal	3,840,700	1,512,400 15,000 3/	5,353,100 15,000 3/	1,394,100	
Little River System					
5a-11	464,600	238,700	703,300	255,400	2.75:1
5a-12	108,800	32,100	140,900	31,300	4.50:1
Subtotal	573,400	270,800	844,200	286,700	
Total	4,414,100	1,798,200	6,212,300	1,680,800	

1/ 1974 Current normalized prices.
2/ Average annual cost amortized over a 100-year period at 5-7/8 percent interest.
3/ Incidental recreation.

Appendix table VII-10--Present and projected forest land under the baseline projection and the recommended alternative, St. Francis River Basin, year 2000

	Alternative	
	Baseline projection	(D) Recommended
	acres	
Present forest - 1969	985,000	985,000
Clearing for:	111,600	116,000
Crops	100,400	104,400
Pasture	6,200	6,200
Urban	5,000	5,000
Floodwater retarding structures	0	400
Planting	0	6,200
Projected forest - 2000	873,400	875,200
Noncommercial	37,200	37,200
Commercial	836,200	838,000
Wildlife development	65,500	137,000
Recreation development	4,800	10,800
Timber production 1/	831,400	827,200

1/ Commercial forest minus recreation development.

Appendix table VII-11--Forest management practices under the baseline projection and the recommended alternative, St. Francis River Basin, year 2000

	Unit	Quantities needed 1/	Alternative			
			Baseline projection		(D) Recommended	
			provides	remaining	provides	remaining
Forest management plans	acres	691,000	150,000	541,000	178,100	512,900
Critical area stabilization						
Tree planting	acres	13,200	0	13,200	13,200	0
Logging roads and skid trails	acres	2/	118,300	0	112,600	0
Grazing removals	acres	78,800	15,700	63,100	43,800	35,000
Tree planting	acres	51,600	15,700	35,900	22,100	29,500
Timber stand improvement	acres	373,100	95,900	277,200	135,100	238,000

1/ See table IV-8.
2/ Total acres needing stabilization will vary under the alternative.

Appendix table VII-12--Annual timber growth and product yield under the baseline projection and the recommended alternative, St. Francis River Basin, years 1980, 2000, and 2020

Year	Alternative			
	Baseline projection 1/		(D) Recommended 2/	
	Annual growth	Product 3/ yield	Annual growth	Product 3/ yield
	- - - - - - - - - - Cubic feet per acre - - - - - - - - - -			
1980	36.8	24.2	36.8	24.2
2000	42.8	36.4	43.8	37.2
2020	49.2	46.7	50.8	48.3

1/ Current level of management.
2/ Medium level of management.
3/ Product yield - the growth available for products is a percentage of the net annual growth: 1980 - 70 percent; 2000 - 85 percent; 2020 - 95 percent.

Appendix table VII-13--Timber product needs and supply under the baseline projection and the recommended alternative, St. Francis River Basin, year 2000

Plan	Needs 1/	Supply 2/	Unsatisfied needs
	- - - - - - - - Million cubic feet - - - - - - - - -		
Baseline projection	35	28	7
Recommended alternative (D)	35	28	7

1/ OBERS table IV-2.
2/ Includes saw and veneer logs, miscellaneous wood products, pulpwood, and fuelwood.

Appendix table VII-14--Estimated average annual gross erosion and sediment yield from forest land by conditions under the baseline projection and recommended alternative, St. Francis River Basin, year 2000

Forest conditions and problems	Alternative	
	Baseline projection	(D) Recommended
	- - - - - - - Tons per year - - - - - - - -	
Gross erosion		
Undisturbed	288,800	307,500
Disturbed 1/	663,900	430,900
Total	952,700	738,400
Sediment yield		
Undisturbed	2,000	2,100
Disturbed 1/	74,100	45,200
Total	76,100	47,300

1/ Includes logging areas, skid trails, logging roads, fire, and grazing. Treatment of skid trails, logging roads, and grazing expected to be done under the Federal Water Pollution Control Act Amendments of 1972.

Appendix table VII-15--Estimated forest practices cost under the baseline projection and recommended alternative, St. Francis River Basin, year 2000

Practices	Alternative	
	Baseline projection	(D) Recommended
	- - - - - - - Million dollars 1/ - - - - -	
Tree planting		
Critical	-	5.5
Inter and other	0.6	0.9
Timber stand improvement	2.7	3.0
Grazing exclusion 2/	1.7	4.9
Logging roads and skid trails 2/	9.7	9.3
Technical assistance	0.6	1.2
Total	15.3	24.6

1/ Price Base: 1970.
2/ Treatment under the Federal Water Pollution Control Act Amendments of 1972.

Appendix table VII-16--Additional forest land needed to satisfy timber production needs under the baseline projection and the recommended alternative, St. Francis River Basin, year 2000

Plan	Additional forest land
	Acres
Baseline projection	192,000
Recommended alternative (D)	188,000

Appendix table VII-17--Forest employment and income under the baseline projection and recommended alternative, St. Francis River Basin, year 2000

Forest employment	Unit	Alternative	
		Baseline projection	(D) Recommended
Land treatment practices and technical assistance			
a. Number	man-years	734	924
b. Income	million dollars	6.4	6.9
Forest management, protection, and industries			
a. Number	man-years	1,000	1,000
b. Income	million dollars	6.4	6.4
Total			
a. Number	man-years	1,734	1,924
b. Income	million dollars	12.8	13.3

Definitions

Commercial forest land - Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation.

Cropland - Land under cultivation within the past 24 months, including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards and land in soil improving crops, but excluding land cultivated in developing improved pasture.

Farm - A place of 10 or more acres from which the sale of agricultural products totaled $50 or more annually, or a place of less than 10 acres from which the sale of agricultural products totaled $250 or more during the previous year.

Farm and miscellaneous lands - Privately owned lands other than forest industry.

Forest land - Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use. (Also see Commercial forest land, Noncommercial forest land, Productive-reserved forest land, and Unproductive forest land.) Includes chaparral areas in the West and afforested areas. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classed as forest if less than 120 feet in width.

Forest types - A classification of forest land based upon the tree species presently forming a plurality of stocking. For poletimber size trees and larger, stocking is determined from basal area occurrence and for trees less than 5.0 inches d.b.h. from numbers of trees.

Major Eastern Forest Type Groups

Oak-Pine - Forest in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which southern pines comprise 25-50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-Hickory - Forests in which upland oaks, or hickory, singly or in combination, comprise a plurality of the stocking except where pines comprise 25-50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Oak-Gum-Cypress - Bottom land forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprise a plurality of the stocking except where pines comprise 25-50 percent, in which case the stand would be classified oak-pine.

(Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-Ash-Cottonwood - Forests in which elm, ash, or cottonwood, singly or in combination, comprise a plurality of the stocking. (Common associates include willow, sycamore, beech, and maple.)

Growing stock volume - Net volume in cubic feet of live sawtimber and poletimber trees from stump to a minimum 4 inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Growing stock trees - Live sawtimber trees, poletimber trees, saplings, and seedlings meeting specified standards of quality or vigor; excludes cull trees.

Growth - See definitions for "Net annual growth."

Hardwoods - Dicotyledonous trees, usually broadleaved and diciduous.

Industrial wood - All commercial roundwood products except fuelwood.

Land area - Census definition: The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area. Forest survey definition: Same as above except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

Logging residues - The unused portions of poletimber and sawtimber trees cut or killed by logging.

Mortality - The volume of sound wood in live sawtimber and poletimber trees dying from natural causes during a specified period.

National forest land - Federal lands which have been designated by Executive order or statute as National forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones title III lands.

Net annual growth - The annual change in volume of sound wood in live sawtimber and poletimber trees resulting from natural causes.

Net volume in board feet - The gross board-foot volume of trees less deductions for rot or other defect affecting use for lumber.

Net volume in cubic feet - Gross volume in cubic feet less deductions for rot.

Noncommercial forest land - Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and productive forest land withdrawn from commercial timber use through statute or administrative regulation.

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Nonforest land - Land that has never supported forest and lands formerly forested but now developed for nonforest uses such as crops, improved pasture, residential areas, city parks, improved roads, and adjoining rights-of-way, power-line clearings, and certain areas of water classified by the Bureau of the Census as land. (See definition for land area.) In forest areas unimproved roads, streams, canals, and nonforest strips must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land.

Nonstocked areas - Commercial forest land less than 10 percent stocked with growing-stock trees.

Other land - Includes areas developed for residential, industrial, or related purposes and all nonforest land not included in any other specified land use class.

Other removals - The net volume of growing-stock trees removed from the inventory by cultural operations, such as timber stand improvements, land clearing, and changes in land use.

Ownership - The property owned by one owner, including all parcels of land in the United States.

Pasture and rangeland - Land which is currently improved for grazing by cultivation, seeding, or irrigation, and natural grasslands that never supported tree growth.

Plant byproducts - Wood materials from primary manufacturing plants (such as slabs, edgings, trimmings, miscuts, sawdust shavings, veneer cores and clippings, and pulp screenings) that are used for some products.

Plant residues - Wood materials from primary manufacturing plants that are not used for any product.

Poletimber stands - Stands at least 10 percent stocked with growing-stock trees, of which half or more of the stocking is sawtimber and/or poletimber trees with poletimber stocking exceeding that of sawtimber. (See definition of Stocking.)

Poletimber trees - Live trees of commercial species at least 5.0 inches in diameter breast height but smaller than sawtimber size, and of good form and vigor.

Productivity class - See definition for site classes.

Productive-reserved forest land - Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Rotten cull trees - Live trees of commercial species that do not contail a saw log now or prospectively, primarily because of rot (e.g., when rot accounts for more than 50 percent of the total cull volume.)

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Roundwood products - Logs, bolts, or other round sections cut from trees.

Saplings - Live trees of commercial species 1.0 inch to 5.0 inches in diameter at breast height and of good form and vigor.

Sapling-seedling stands - Stands at least 10 percent stocked with growing stock trees of which more than half are saplings and/or seedlings.

Saw log - A log meeting minimum approved log-grade specifications, or, for species for which approved log grades are lacking; at least 8 feet long, with a minimum d.i.b. of 6 inches, and with deduction for defect no greater than two-thirds the gross volume.

Sawtimber stands - Stands at least 10 percent stocked with growing-stock trees, with half or more of the total stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber trees - Live trees of commercial species containing at least one saw log. Softwoods must be at least 9.0 inches in diameter breast height, except in California, Oregon, Washington, and coastal Alaska where the minimum diameter is 11.0 inches. Hardwoods must be at least 11.0 inches in diameter in all States.

Sawtimber volume - Net volume of the saw log portion of live sawtimber trees in board feet.

Seedlings - Established live trees of commercial species less than 1.0 inch in diameter at breast height and of good form and vigor.

Site classes - A classification of forest land in terms of potential growth in cubic feet of fully stocked natural stands.

Softwoods - Coniferous trees, usually evergreen having needle or scalelike leaves.

Stand-size classes - A classification of forest land based on the predominant size of timber present, that is, sawtimber, poletimber, or seedlings and saplings.

State, county, and municipal land - Land owned by States, counties, and local public agencies, or lands leased by these governmental units for more than 50 years.

Stocking - A measure of the degree to which forest land is occupied by trees of specified classes in relation to a specified basal area standard for trees 5.0 inches d.b.h. and larger, or numbers of trees per acre for trees less than 5.0 inches; tree classes include (1) all live trees, (2) growing-stock trees, and (3) desirable trees. Classification of forest land and forest types are based on stocking of all live trees. Classification of condition classes is based on stocking of desirable trees.

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Timber products - Includes (a) roundwood products such as saw logs, veneer logs and bolts, cooperage logs and bolts, pulpwood, fuelwood, piling, poles, posts, hewn ties, mine timbers, and other round, split, or hewn products, and (b) byproducts of primary wood manufacturing plants.

Timber removals - The net volume of growing stock trees removed from the inventory by harvesting; cultural operations, such as timber-stand improvement; land clearing; or changes in land use.

Unproductive forest land - Forest land incapable of yielding crops of industrial wood because of adverse site conditions. Includes sterile or poorly drained forest land, subalpine forests and steep rocky areas where topographic conditions are likely to prevent management for timber production.